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WORLD TELEPHONE STATISTICS SHOW VARIATIONS IN DEVELOPMENT

Because it requires a good deal of time to obtain authoritative data from the remote countries, the complete world telephone figures for January 1, 1931, have only now been compiled. These statistics were released April 15 by the American Telephone & Telegraph Co., and will be studied with interest by all telephone men as showing the general trend of their industry since business conditions slowed down.

On the date mentioned, there were 35,336,467 telephones in the entire world, of which 20,201,576—or about 57 per cent—were in the United States. The United States and Canada had more than double the number of telephones in Europe, which had approximately 30 per cent of the world's total. About 9 per cent are located in the other parts of the globe.

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The rate of world telephone development was perceptibly reduced in 1930, and even caused some countries to lose telephone stations. Last year brought no marked improvement in the economic situation. When the 1931 record is completed, it will doubtless be found that there has been no gain throughout the world. The world gain in 1930 was 865,729 over the 1929 figures, the increase in the United States—133,553—being the largest gain reported by any country.

Reports from all countries show that the telephone business has suffered less from the depression than other industries, but that restricted industry has temporarily halted growth in communication facilities.

As in the past, the United States leads the world in the number of telephones according to population. The latest statistics show 16.4 stations per 100 people, which is eight times greater than Europe's quota. Canada, with 14 telephones per 100 persons, is the only country in the world whose telephone facilities in proportion to population approach those in Uncle Sam's domain.

New Zealand holds third place, with 10.2 telephones per 100 people, while Denmark is fourth with 9.9, followed by Sweden with 8.7, and Australia with 8.1 per 100 population.

In the total number of stations, Germany ranks next to the United States, but has only five telephones per 100 people, while Great Britain has 4.3 and France only 2.8. Argentina, with 2.6 telephones per 100 persons, has nearly one-half of all the stations in South America. Japan leads the Asiatic countries with 1.4 telephones per 100 people; and the Union of South Africa heads the African continent with the same ratio.

* * * *

Some small towns and rural sections in the United States are well provided with telephones, as the new figures show that communities with less than 50,000 population have 12.2 stations for each 100 people. This exceeds the facilities possessed by even the large European cities which have the bulk of telephones in their respective countries.

While telephone development is widespread in the United States, and abroad the great majority of stations is in metropolitan centers, the latest statistics show that American cities are generally far ahead of foreign cities in the extent of service. For instance, the eight cities in the United States having more than a million population had, on January 1, 1931, an average of one telephone for every four people, and the 52 American cities of more than 200,000 population were almost equally well equipped telephonically. This development exceeds the telephone density of all large foreign cities except two.

San Francisco with 40.2 telephones for each 100 inhabitants leads the larger cities of the world in telephone development. Washington is second, Seattle third, and Denver is a close fourth.

In absolute numbers, the telephones of large American cities are more nearly comparable with the telephones of foreign countries, and even continents, than with those of individual cities abroad. New York City, for example, has considerably more telephones than France, nearly as many as Great Britain, and more than one-half as many as Germany.

Chicago has about as many telephones as there are in all of Spain, Italy and Russia added together. Los Angeles has more telephones than any European country except Germany, Great Britain, France or Sweden. The telephones of New York City out-number those of Asia and Africa

combined, while Chicago has considerably more telephones than either South America or Oceania, all the islands of the sea.

The distribution of telephone facilities abroad is of greater significance to Americans now that they can talk with 92 per cent of all the telephones throughout the world. The telephone system of the United States is connected with most of the telephones in North and South America, Europe and even Australia, as well as a small district in Northwest Africa.

Telephone Taxes.

Many changes are being made in the tax bill now being prepared in Congress, but, with all the alterations recorded, the proposed taxes on telephone and telegraph messages remain as originally fixed. The argument that it would be unwise at this time to saddle additional expenses on business transactions applies directly to the new levies on communications, but it apparently has no effect on the Congressmen who are desperately rooting around to find means to raise more money to balance the federal budget.

An interesting comment on the telephone tax proposition in the Public Utilities Fortnightly says:

"The leaders of both the electrical and telephone industries made a reputable showing before the ways and means committee. The members of the committee seem to be impressed by the fact that increased taxes are chargeable in their entirety against the operating expenses of a public utility, hence would be passed on directly to a class of people less able to carry the increased financial burden than other classes.

Of course, every business, when it is taxed, attempts to pass the burden of the increase on to its patrons, but in unregulated businesses this is not always possible because of the factor of competition; such businesses themselves, accordingly, absorb in whole or in part the increased levy. A utility, however, with monopolistic territorial rights, can pass the increased tax burden squarely on to the shoulders of the consuming public. The members of Congress seem to hesitate to assume responsibility for the enactment of such legislation.

* * * *

In addition to this argument, President F. B. MacKinnon, of the United States Independent Telephone Association, made other convincing argumentative points. He observed that most leaders are agreed upon the proposition that essential industries, including the utility services, should not be handicapped at this time when business is struggling up out of the valley of depression, and needs all the cooperation possible from the legislatures.

Additional taxes, therefore, should first be aimed at luxuries, amusements and other items which might be termed non-essentials. It is an interesting fact that some of the representatives of the so-called 'non-essential industries' were the most outspoken in suggesting the advisability of imposing increased taxes on the utilities."

This practice of "passing the buck," or "letting George do it" was a natural game to play. However, it is noticed that the revised bill imposes a tax on all classes, as Washington decided it could not afford to overlook anybody in order to secure sufficient revenue to balance the budget.

COMING CONVENTIONS.

Kansas Telephone Association, Jayhawk Hotel, Topeka, April 19 and 20.

Wisconsin State Telephone Association, Loraine Hotel, Madison, April 26, 27 and 28.

United States Independent Telephone Association, Southern District, Bristol, Tenn., General Shelby Hotel, May 4, 5 and 6.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 11 and 12.

Pennsylvania State Telephone & Traffic Association, Penn-Harris Hotel, Harrisburg, May 17, 18 and 19.

Up-State Telephone Association of New York, Jamestown Hotel, Jamestown, May 26 and 27.

North Dakota Telephone Association, Hotel Powers, Fargo, May 26 and 27.

The Reducing of Line Joint Unbalances

Telephone Transposition Systems Affected by Resistance Unbalance of Conductors—Testing Methods for Unbalance—Soldering Sleeve Joints Made Necessary by Power Line Parallels—Suggestions for Making Line Connections

By T. De Witt Talmage,

Transmission Engineer, Illinois Telephone Association, Springfield, Ill.

One of the most successful men in the telephone industry today has the commendable habit of tackling his hardest jobs first. He did not always have this habit. Early in the business he was a loyal member of that misguided group of people who, when they think a job is hard or disagreeable, begin to look around for an easy way to "get by." Fortunately, this man learned long ago that if a person would only dig into his job and complete the most difficult work first, he would have at the most only an unpleasant half-hour or half-day. But by trying to side step it he lets himself in for days, weeks, or months of worry.

Without trying to moralize, it would seem that a hard problem, squarely met, is never as bad as it first may appear; but a problem put off keeps growing, like a snowball rolling down hill.

Just why reducing noise on metallic telephone circuits caused by line-joint resistance unbalance should be classified among the hard jobs is a difficult thing to understand. Yet it is classed that way by many telephone companies, if they are to be judged by the manner in which they delay and postpone remedial action on their noisy circuits.

It is the purpose of this article to describe the simplicity and effectiveness of the method used by one company in reducing to a minimum the direct-current resistance unbalance of transposed line conductors exposed to paralleling electric light and power circuits. This, in turn, reduced the disturbing noises to a permissible amount.

In order to present the problem more clearly, a brief review of some of the principal factors involved may be helpful.

Disturbing noise conditions in telephone circuits usually result from a combination of causes. While most of these causes are well known, it is regrettable to sometimes find that the trivial and inconsequential conditions receive a great deal of attention while the major causes of the noise effects are slighted or do not receive their proper share of consideration.

For example, it is not always appreciated that slight corrosion, resulting in an increase of the normal resistance of a splice, makes an unbalance in a circuit. And it is this type of unbalance that is such a common cause of noisy circuits.

According to one of the best authorities, a metallic telephone circuit that is balanced in all respects, including balance to other circuits, is immune to high-frequency inductive interference (noise) in the metal circuit; however, it is practically impos-

sible to secure perfectly balanced circuits and the unbalances which exist contribute to the noise when the circuits are exposed to power lines. Therefore, where such exposure to power lines exist, it is necessary to eliminate once and forever unbalances due to abnormal resistance of wire splices or joints.

Noise may be caused by unbalances (mutual) with respect to the power circuit or unbalances (self) between the two sides of the telephone circuit with respect to ground or other telephone circuits. In the actual case, the mutual unbalances are kept at a minimum by means of transpositions whereby unbalances existing in one section are neutralized by those in an adjacent section of the line.

Hence it is quite important that efficient transposition systems be installed in both power and telephone circuits. Naturally, transposition errors—regardless of whether in exposed or unexposed sections—are a source of mutual unbalances.

However, it is with the second type of unbalance just defined that we are particularly concerned in this discussion. From the definition of self unbalances it can readily be seen that a self unbalance might exist even though all other conductors, except those of the circuit under consideration, were removed to a great distance. Since both sides of a telephone circuit are usually constructed of wires having the same size and conductivity and at the same distance above the earth, there are no large inherent or inborn self unbalances.

Self unbalances are largely accidental and arise from such causes as defective (high resistance) joints, broken insulators, tree leaks, or from absence or defect of symmetry in apparatus inserted in the circuit. Unbalances of this type do not depend upon the condition of surrounding circuits, although the noise effects caused by these faults of balance may so depend.

Circuit insulation, of course, is an important consideration, but most telephone men are familiar with insulation requirements. Moreover, it is customary to supplement the usual insulation resistance tests with visual inspections, in order to keep a close check on poor insulation conditions caused by broken insulators or tree leaks. From the standpoint of visual inspection the defective joint problem is more difficult because high-resistance joints are an invisible condition and as such deserve greater emphasis.

From the foregoing explanation it can be understood that telephone circuits which are badly unbalanced are very much more susceptive to inductive troubles than those which would otherwise be considered satisfactory.

While defective joints, loosened by the expansion and contraction of the metals due to temperature changes and corroded by entrance of moisture and gases, *may* not appreciably affect the volume of telephone transmission over the circuit, it has been found in a great many instances they do.

Where this condition is encountered, it is necessary to remove the bad joints in order to improve the conductivity of the circuit and thereby increase the volume level of transmission. This is for the reason that the interfering effect of noise is much less on a high level of transmission than it is on a low level.

All this is elementary to the well-informed telephone man—but everything of importance in any business is elementary. Our business becomes difficult and complex only when the elements are forgotten

"Telephone Circuits Which Are Badly Unbalanced," Says Mr. Talmage, "Are Much More Susceptive to Inductive Troubles Than Those Which Would Otherwise Be Considered Satisfactory."

in an effort to make haste too fast, calling such work "temporary," or in an effort to delay necessary activity until "tomorrow"—and it seems that tomorrow never comes.

In discussing the elements of the problem of determining inequality of resistance between individual conductors—or as more commonly expressed, locating resistance unbalance due to such causes as defective splices in cable pairs or defective sleeve joints in open wire—it may clarify the picture to outline briefly some of the common methods of making direct-current tests for measuring the electrical balance of circuits.

The premise which should be understood at this point is that the insulation of the line wires being tested for resistance unbalance is as high as practicable. Similar circuits on the same pole line should have practically the same insulation resistance per mile. If there is any substantial difference, the circuits having the lower values should be carefully inspected and the cause of the difference corrected.

The most convenient way of measuring the resistance of each conductor of a circuit makes use of a Wheatstone bridge. This is an instrument which has been universally used for nearly 100 years to determine electrical resistance accurately.

When two good wires are available the resistance of either of them may be obtained by the Varley or Murray loop tests. In this method the resistance of each wire is determined by first measuring the loop resistance of the circuit and then making the Varley or Murray loop tests with the two wires grounded at the distant test point.

A more simple, but less reliable, method of measuring the resistance of a wire is to ground it at the distant point and measure its resistance at the central office by connecting the Wheatstone bridge between the wire and the central office ground connection. Results from this method are not always accurate.

Foreign or earth potentials, if present, are liable to make it difficult to obtain a balance with the bridge galvanometer. In such cases better results may be obtained with the use of a voltmeter calibrated in ohms. However, it should be kept in mind that the resistance measurement so obtained includes the combined resistance of the ground and ground connection at each end of the wire plus the resistance of the wire itself.

It should be pointed out that resistance measurements with a voltmeter are, as a rule, used as rough approximations to the more accurate measurements which are usually obtained with a Wheatstone bridge.

If three wires—or what is more likely, the four wires of a phantom group—are available, the resistance of any one of the wires may be determined by making loop combinations between them and setting up simple equations for these loop resistance readings. It is then possible to calculate the resistance of each wire by solving these equations. This method is well known and a detailed explanation will, therefore, be omitted.

A modification of the Varley test may be used for accurately measuring resistance unbalances and is in some respects preferable to the method of combination loop measurements. It is called the "metallic Varley" and consists of replacing the battery return circuit through the ground (as in the usual arrangement) by one of the wires of the group.

When all combinations of wires have been tested, except the wire being used for the battery return side of the circuit, this wire is interchanged with a wire that has been tested, and a measurement is then made on the final wire.

The schematic drawing in the upper part of Fig. 1 shows the usual grounded Varley hook-up while the sketch in the lower part of the same figure shows the metallic Varley arrangement.

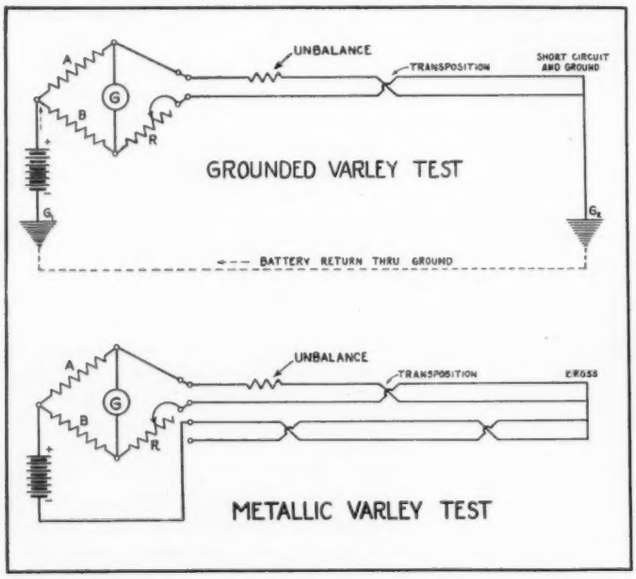
In the metallic Varley testing hook-up, illustrated in the lower half of Fig. 1, it

sometimes happens that a balance cannot be obtained at first. This condition indicates that the higher resistance is in series with R and the connections to the bridge terminals should be reversed. If the bridge arms, A and B, are equal, the value of R secured represents the actual difference between the resistance of the two wires, and no calculation is required.

Transpositions are most effective in balancing the wires of a circuit against either noise interference or crosstalk only when the conductors of the circuit are in all other respects electrically equal or balanced throughout their entire length.

However, in making direct-current resistance tests for balance, it should be remembered that an overall measurement of a circuit does not necessarily tell the whole story unless such a measurement checks very closely to the accurately computed normal resistance of the wires.

For example, suppose that a 16-mile circuit composed of two 8-mile transposition sections, balances perfectly on an overall circuit test using the metallic Varley. But another measurement to the "S" pole at the junction of the two transposition sections indicates that wire No. 1 has seven ohms more resistance than wire No. 2.



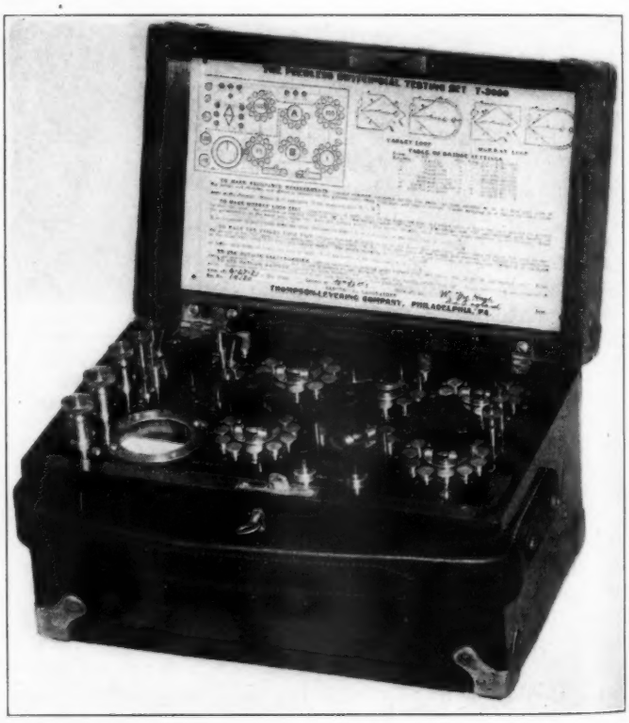


Fig. 1. Methods of Measuring Resistance Unbalance with a Wheatstone Bridge. The Metallic Varley Test, Shown in the Lower Half of the Diagram, Is Recommended Where More Than Two Wires Are Available—Fig. 2. Photograph of a Portable Wheatstone Bridge Used for Measuring Resistance. A Card of Directions for Various Tests, with Simple Formulas, Is Shown in the Lid of the Test Set.

This means, therefore, since the wires are equal in their total resistance, that wire No. 2 must have seven ohms more resistance in the second section than wire No. 1. In other words, both transposition sections are unbalanced.

An "S" pole is the neutral point in a transposition system—that is, a point at which the maximum degree of balance is obtained between all circuits on the telephone line. Such neutral points are provided where there are discontinuities in line construction or in the parallel with the power circuit.

Therefore, to be effective *each* transposition section must be balanced within itself from a resistance standpoint. It would be necessary, in the case just described, to eliminate the seven ohms unbalance in both transposition sections in order to secure a point that was neutral in every sense of the foregoing definition of balance requirements.

Testmen familiar with the problem of balancing phantom groups to prevent crosstalk, have used certain resistance unbalance limits to guide them in their work. It has been customary to work toward a limiting resistance unbalance of not more than two ohms between the two wires used as a side circuit in a phantom group. The resistance of the two sides of the phantom circuit itself should not vary more than three ohms.

These limiting values are, in general, satisfactory in preventing crosstalk babble on short-haul circuits but in the cases of severe parallels with high voltage transmission circuits these limiting values may have to be scaled downward.

The problem of locating resistance unbalances resolves itself into the locating of the transposition sections containing the faulty splices, and finally narrowing the trouble down to the particular spans and then joints within the spans that are causing the abnormal condition.

In order to prevent breaking down a high-resistance joint, care must be taken not to ring over the circuit which is being tested or to connect high-voltage battery to it either before or during the test.

The test voltage on the bridge should be just sufficient to produce a satisfactory deflection of the galvanometer. For example, the portable Wheatstone bridge shown in Fig. 2 utilizes two small batteries of three cells each, having a total of only nine volts.

Sometimes stray current flow may be encountered on the circuits being tested. When this condition exists the battery supply may have to be increased so that the galvanometer deflections due to the test current, may be larger than those due to the stray current.

In some cases, such as iron wire circuits that have practically outlived their usefulness, the locating of *each* bad joint would consume an excessive amount of time. In such cases the most satisfactory plan might be to start at one end of the circuit and solder every splice in the wires until the other end of the circuit is reached. Soldering old splices is one of the most effective ways of reducing the resistance of the connections to a minimum.

One company that followed this plan of soldering every joint in sight, had a testman accompany the lineman doing the work. The testman reported that out of 127 sleeve joints that were soldered, 91 per cent or 116 splices showed reduced resistance after soldering.

It is not necessary to cut the line wire in order to remedy the faulty joints. In the case of a joint in the middle of a span, the wire can be untied and lowered to the ground or to the truck, or ladders may be used in various ways. It is then an easy job to file a notch through the sleeve, exposing both line conductors, and solder the two wires thus exposed to the sleeve.

In the case of splicing sleeves used on

iron wire, it is only necessary to file a notch in the middle of the sleeve. A 10-inch round file or an ordinary mill bastard file can be used to make the notch.

It is not necessary to file an excessively deep notch. A little practice with the right kind of a file will soon indicate the correct depth of a notch that can be easily filled up with solder and which will result in a constant low resistance connection.

Soldering Suggestions.

The secret of proper soldering work lies not only in the careful cleaning of the metal surfaces involved but also in the adequate heating of the metals to be united. Thus in soldering the two iron

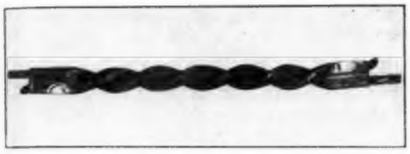


Fig. 3. Photograph of a Defective (High Resistance) Sleeve Joint in Copper Wire. To Remedy the Condition the Sleeve Was Notched with a File at Each End Deep Enough to Expose the Wire and Then Soldered. Note That Only the Dead End of the Wire Was Notched.

wires exposed in a notched sleeve, it is necessary to heat the wires and the sleeve to the melting point of the solder. Then applying acid-core solder to the heated metals will result in a soldered joint that will serve satisfactorily.

It should be kept in mind at all times that running hot solder on cold metals will not give a satisfactory job. While the solder may appear to stick to the cold metals, it will not unite or fuse; and any soldering work in which the solder has not alloyed or combined with the metals, although it may look smooth, is defective.

In soldering the notch in the sleeve the metals may be heated up to the melting point of the solder by means of a lineman's gasoline blow torch or a Prest-O-Lite (acetylene gas) torch. Care should be used not to overheat the wire, for such practice may result in injuring the zinc galvanizing on iron wire or annealing (softening) hard-drawn copper wire.

A good method of determining the correct heat of the metals, which guards against overheating the wire, is to touch the acid-core solder to the notch at the *same time* the heat is applied adjacent to the soldering surfaces of the joint, and continue heating until the solder melts and flows smoothly over the hot metal exposed in the notch. The heat should be removed just as soon as the solder flows freely.

This method guarantees that the wire is heated only to the melting point of the solder, and such a temperature has no detrimental effect.

Some may wonder just why it was suggested in a preceding paragraph to direct the flame of the torch "adjacent to the soldering surfaces of the joint." This is for the reason that a direct flame on the metals causes rapid oxidization and carbonization of the surface, which retards the soldering process. The flame should always be directed to one side of the spot where it is planned to have the solder adhere.

A word of caution about fluxes used in soldering line joints. Some telephone men have attempted to solder with "cut" muriatic acid (a common soldering flux, well known as a solution of chloride of zinc) which they have prepared themselves. This is a dangerous practice because many times such home-made flux is improperly prepared and contains an abnormally high percentage of free acid. This free acid in the flux attacks the zinc in the galvanizing on the iron wire and damages the coating which protects the iron from corrosion.

Others have tried to solder galvanized iron wire by using "raw" muriatic (hydrochloric) acid and have depended upon the chemical reaction occurring between the zinc coating and the acid to provide sufficient $ZnCl_2$ (chloride of zinc) to flux the job. Such a foolish practice cannot be too heartily condemned as it is very damaging to the protective coating of iron wire.

The most convenient and satisfactory flux and solder to use in soldering joints in galvanized iron wire circuits is the standard acid-core wire solder. This solder is usually composed of 40 per cent tin and 60 per cent lead by weight. The flux in the core of the wire solder is a chloride salts solution that is compounded to produce a rapid and efficient fluxing action.

After soldering a joint with acid-core solder the experienced workman will always remove the flux residue by washing the soldered connection with a rag or sponge saturated with water. This cleaning process removes all traces of the fused chlorides which may remain and prevents any harmful corrosive formations.

It takes but a few seconds to wash such a soldered joint with a water-soaked rag, and those who take pride in the thoroughness of their work will not overlook this essential part of proper soldering practice.

Soldering Copper Wire.

In soldering sleeve joints in copper wire, one company used a slightly different method of notching the sleeve than has been described. Each sleeve was double notched. That is, a 10-inch round file was used to file a notch in each end of the splicing sleeve about in the middle of the space occupied by the connectors when the sleeve was twisted.

This notch was deep enough to penetrate the sleeve and cut into the wire. Care was exercised that *only the dead end of the wire was notched*, rather than the line end, in order not to lessen the tensile strength of the wire at that point. A photograph of such a soldered sleeve joint is shown in Fig. 3.

Additional precautions were taken in soldering these double notched copper sleeves to the hard-drawn copper wire to prevent the possibility of annealing the wire. A soldering copper, heated by acetylene gas, was used to prevent overheating of the wire.

A soldering copper is a safeguard against such an occurrence because its temperature is easily controlled and, as stated before, normal soldering temperatures have no detrimental effect on either hard-drawn copper or galvanized iron wire.

There are available two sizes of soldering coppers which are heated by acetylene gas. In both tools the gas flame is entirely concealed within the head of the copper which eliminates the possibility of burning insulation or other inflammable material adjacent to the connection being soldered. The larger acetylene gas soldering copper is particularly suitable for use on open wire connections.

For this work a wedge-shaped copper tip will be found convenient. The wedge-shaped point can be improved by filing a groove across the tip. This groove is then tinned. Fig. 4 shows such a soldering copper treated in this manner. The wire joint is placed in the tinned groove when being soldered.

The advantage of the grooved wedge-shaped copper tip over the ordinary pyramid-like tip is that the groove speeds up the soldering of joints because it has greater contact surface which may be used to heat up the wire to the melting point of the solder. The groove has the further advantage of improving the quality of the soldering work as the proper use of the groove serves to better distribute the solder over the entire joint.

For ordinary outside work the soldering copper illustrated in Fig. 4 is used with a

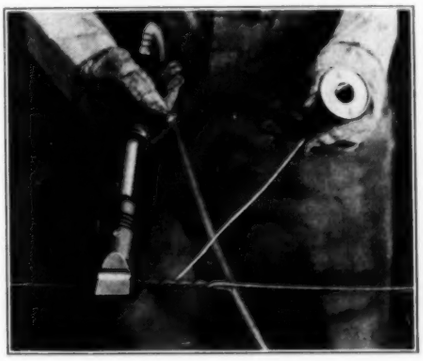


Fig. 4. Soldering Copper Heated by Acetylene Gas. Note Groove Filed Across Wedge-Shaped Tip Which Facilitates Soldering Wire Joints.

five-pound regulator on the acetylene gas tank. This regulator automatically holds the gas at uniform line pressure regardless of whether the gas tank is full, half full or nearly empty. Uniform line pressure prevents variation in the flame.

Such a soldering outfit is a portable affair as small tanks of acetylene gas can be secured with handles or carrying assemblies. When a long hose (20 feet or

more) is to be used—especially if the work is to be done in the open and during cold, windy weather—a ten-pound pressure regulator at the tank and a needle valve at the soldering copper is used. This needle valve permits reducing the gas flow when the full ten pounds of pressure is not required, thereby preventing overheating the soldering copper.

The second style of acetylene gas-heated soldering copper is somewhat smaller in size and capacity than that just described. When this small copper is operated at five-pound pressure, it supplies ample heat for soldering, even in cold or windy weather. For inside work when the full five pounds of pressure is not required, a needle valve is provided by means of which the pressure may be reduced.

Another aid in soldering copper wire joints is the fact that rosin-core wire solder may be used instead of acid-core solder. Rosin exercises its fastest fluxing action on copper and, in addition, is the only non-corrosive flux known to chemical science. The rosin residue on the joint does not attack the copper and has no tendency to gather moisture, dust, or other foreign matter. Consequently, it is not necessary to wash the rosin-fluxed soldered joint with water to remove the residue.

The electrical balance of circuits is one of the most important elements in the consideration of the fundamentals of present-day telephone transmission practice. In this discussion it has been emphasized that in all telephone work the two sides of the talking circuit should be as nearly identical as possible. In consequence, throughout the entire telephone plant there is perhaps no other maintenance consideration more important than the electrical balance of telephone circuits to prevent noise and crosstalk.

In conclusion it should be stated that the faulty joint problem is doubly important because not only does the resulting noise and crosstalk interfere with the conversations but the increase in resistance of the connections causes poor conductivity which results in a decreased volume of tone of the voice messages. Furthermore, it appears that the work of locating faulty splices is not as difficult, and the job of removing the high resistance is not as complicated, as some would lead us to believe.

There is absolutely no necessity to tolerate the multiplicity of troubles and complaints which besiege a company whose plant is infested with defective joints. Likewise, there is no sound reason for looking with indifference upon the faulty joint problem as "a necessary evil" and incapable of any economic solution.

No doubt some of the suggestions contained in this discussion may prove of real value when incorporated in an aggressive plan of action directed against this potent enemy of good telephone service.

Following the Telephone, Frontier Becomes Vacationland.

What has been appropriately named "the last western frontier" was invaded by the telephone recently when the new telephone line of the Pacific Telephone & Telegraph Co. from Quinault, Wash., to Kalaloch was built into the wild Olympic Peninsula territory. The line is 33 miles long and follows the beautiful new Olympic Loop highway from Lake Quinault to the Indian Village on the ocean beach.

This region contains several Indian reservations and a score of enterprising little communities. Its rivers and forests are unexcelled for fishing and hunting. With introduction of telephone service and completion of the new highway, it will afford a vacation lure to many.

What Operators Want to Know

Use of Judgment Necessary as Rules Do Not Fit Every Condition—Operators' Work Affords Opportunities to Be Kind and Helpful—Customers Critical During Times of Stress—No. 42

By Mrs. Mayme Workman,
Traffic Supervisor, Illinois Telephone Association, Springfield, Ill.

In every line of business we must have rules and regulations, but it is not possible to make a rule to fit every condition. Neither is it possible, in all cases, to adhere strictly to each and every rule. There are, and always will be, times when we must use our judgment to meet the situation.

The first question in our question and answer series of this week is a case of this kind. We have been instructed to educate our subscribers to call by number. This is as it should be. But how unkind and unreasonable we would be to insist that a customer who cannot read, or an elderly person who cannot see very well or perhaps cannot see at all without his glasses, give us the telephone number of the party he wishes to call!

Our work affords us many opportunities to be kind and helpful. That is why we derive so much pleasure and satisfaction from our work, because helpfulness brings happiness. If only more people realized this the depression would not have caused so much havoc.

During normal times, customers, as a whole, are easy to serve. But during times of stress, as we have been experiencing during the past two years, customers are more exacting. Nerves are on edge from worry, and subscribers are inclined to be more critical. We must meet this situation by being especially careful not to do anything that will irritate or annoy the customer. We who are fortunate in having employment should be most considerate of our less fortunate neighbor.

When we have an opportunity to do a kind act, let us take advantage of the situation. Kindliness pays good dividends. I have never done a real kindness that has not paid me in inward satisfaction and brought to my side a friend. In fact, my friends have done so much more for me than I have done for them. This thought inspires me to keep right on being kind to others, for I shall never be able to catch up.

May I suggest that you adhere strictly to rules and operating practices when these rules and practices fit the condition; but do not hesitate to use your judgment when necessary.

Questions from Illinois Operators.

1. Should an operator require a subscriber who cannot read, or one who is old and uses glasses, to give the number instead of the name of the party he or she wishes?
2. Should the tributary in placing long distance calls ask for the time and charge?
3. Please explain how to take care of tickets where the calling party will talk from the calling station but wishes the call charged to another station?
4. Is it best to hold the calling party on the line while completing a particular party call so that they may hear the report given by the operator and in so doing save time repeating?
5. In quoting the charge to a customer do we tell them the exact number of minutes if it is less than the initial period?

For answers to these questions from real Illinois operators, turn to page 38.

Oklahoma District Meeting to Be Held at Guymon May 3.

The first of the 1932 series of district telephone meetings of the Oklahoma Utilities Association will be held at Guymon, Okla., Tuesday, May 3, under the auspices of the Western Telephone Corp. A. G. Davidson of Frederick, district manager, Southwest Telephone Co., and chairman of the telephone division, will preside. Willard Clark of Guymon, district manager, Western Telephone Corp., will act as secretary.

In addition to an interesting program of addresses and entertainment, general discussions will be held on several subjects, including rural line telephone service, public relations, commercial and traffic practices, accounting, construction methods, local and long distance service and maintenance of plant.

South Dakota's Best Annual Convention

Attendance at Annual Meeting of South Dakota Telephone Association Sets a Record—Many Visitors From Nearby States—Program of Unusual Excellence—Plant, Traffic, Commercial and Other Telephone Matters Discussed

The annual convention of the South Dakota Telephone Association held in Sioux Falls, April 6 and 7, surpassed all previous records in attendance as well as in interest and actual benefit derived from the different addresses presented. Those in charge of the program exerted special efforts to make this year's meeting especially worthwhile and were gratified by the numbers of telephone people who came from all over the state to attend the meeting.

Included among the many instructive and educational addresses presented was the demonstration of recent communications developments by Sergius P. Grace, of New York City, assistant vice-president of the Bell Telephone Laboratories, Inc.

The annual banquet, entertainment and dance on Thursday evening attracted a large number of telephone men and women and was a pleasing climax to the successful two-day convention.

H. M. Schumacher, of Alexandria, was reelected president of the association. Other officers reelected are: F. R. Irons, of Woonsocket, vice-president; P. F. Orcutt, of Custer, vice-president; Thos. Phalen, of Aberdeen, secretary-treasurer.

F. H. McGinnis, of Aberdeen, was the only new member elected to the board of directors. The other directors are: Charles E. Adams, of Groton; D. T. Patterson, Sioux Falls; W. W. Straight, of Crooks; F. R. Irons, of Woonsocket; Ira S. Burnett, of Armour; Grant E. Preston, of Hitchcock; P. F. Orcutt, of Custer; and H. M. Schumacher, of Alexandria.

The convention opened on Wednesday morning at 9:30 with President Schumacher presiding. In his annual address Mr. Schumacher said:

President's Address.

"To the thoughtful, forward-looking management there is not a doubt that an association of men conducting like businesses is worth the time and money it costs, in many ways. The benefits of association meetings and conferences are acknowledged and proved by the success in the better service the meetings inspire, as well as being organized to combat unjust attacks on our business.

Therefore I urge you all to get your telephone neighbor interested in our association. Every manager should be enlisted in our activities. He will find that the benefits are not all ours. If a business is worth having, it is worth promoting and protecting. So I am for a 100 per cent membership.

The district meetings are one means through which the membership may obtain benefits from our association. We held two district meetings this past year, one at Madison and the other at Mitchell. Each meeting was divided into two sections: one for the discussion of plant problems, and the other a traffic school. Each meeting was well attended.

I recommend that these meetings be continued the coming year and urge each manager to be present and bring his employes with him. The exchange of ideas, the finding out how other companies are meeting their problems, and the information gleaned, all make association membership well worth while.

H. M. Schumacher, of Alexandria, Who Was Reelected President of the Association, Recommended in His Annual Address That the Companies Maintain Their Rates and Explain to Subscribers Why Cost of Furnishing Service Has Not Come Down.

At the last convention the name of the executive committee was changed to board of directors and the number of members increased to nine, thereby increasing the efficiency of the committee. We authorized the secretary to issue monthly bulletins which have proved to be helpful. If we can continue these bulletins, they will become more helpful as the members learn to use them. The bulletins covered the association activities, gave helpful suggestions from other state associations, and articles concerning the telephone business were given out.

The directors planned that each exchange would be visited by an officer or director of the association. This was carried out as far as possible. The visits were quite successful, as seen from reports sent in. Managers of the companies visited appreciated our offers of assistance and in many cases used the service of the association with excellent results.

We know the telephone industry, like all industries, has received a hard blow from the business depression. We notice it in demands for rate cuts, in the falling off of tolls, in the loss of patrons and in the reduction in the number of employes. Who can figure out how we can induce the old patrons to buy our service and urge new ones to try it? We will have to sell the old service in a new way.

In TELEPHONY of October 24, 1931, was a splendid article on the 'Future of Industry.' Dr. David Friday, the author, is certain America will be the most prosperous country in the world the next 25 or 50 years. Just now everyone sees the future in very darkest terms—but that is not new. All past depressions show the same conditions. An old saying is that 'It is always darkest just before the dawn.'

Because of short crops, low prices for agricultural products, and general business conditions, the effect on our business was naturally adverse. We cannot say that the end is in sight. We must continue to be on the alert and do our part in giving the best telephone service possible, to keep in close touch with every situation which might affect our business, and to use good judgment in dealing with the public we serve.

The rate question is especially aggravating at this time. Experience has shown that the lowering of rates will not keep a telephone in service. Rates once lowered are awfully hard to raise again. The solving of this problem requires careful handling.

Rates for telephone service should be high enough to pay reasonable returns on the money invested to make this telephone business possible, to pay salaries and taxes, to lay away a certain amount each year to rebuild the telephone plant as it becomes worn out, and to keep the plant in good serviceable condition so that the highest class of telephone service can be furnished.

Companies that have had inquiries in regard to requests for service rate reductions advise they have been best able to meet this problem by interviewing their customers. Generally a frank discussion of our business, together with an explanation of why the cost of furnishing telephone service has not come down, will clear up any questions the customer may have in regard to this subject. Misunderstandings are usually the result of lack of knowledge and, consequently, appreciation of others' problems.

All public service companies will derive comfort from a ruling recently made by the Alabama Public Service Commission. The commission declared that utility companies cannot lawfully be compelled to reduce their rates because general commodity prices are at an unusually low mark.

It may be true that in periods of hard times the telephone business does not decline as rapidly as some other businesses. On the other hand the telephone business will lag considerably behind others on the comeback. Under government regulation pyramiding of profits is impossible even in times of prosperity.

The small companies have existed chiefly through their ability to economize at every turn. Therefore, coming at a time when there is so much complaint about rates, the Alabama decision is most opportune in supporting the contention that it is not equitable to cut rates at this time.

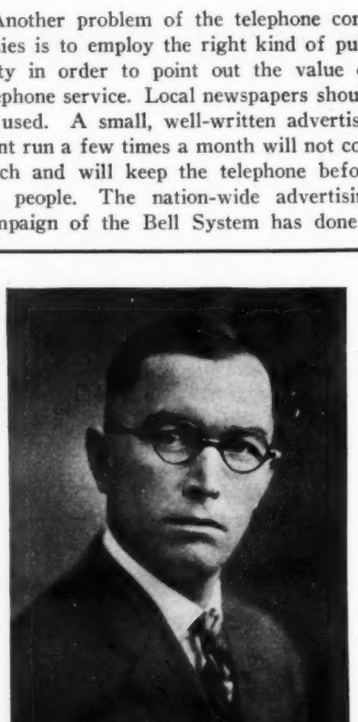
The first month of 1932 saw many campaigns put on by telephone companies. The average telephone man is eager to hear about practical plans to get new business and to re-install lost stations. In every community there are families without telephone service who will buy it once they appreciate its value. There are no goods to be sold over a counter, so our salesmanship must consist in presenting the use of telephone facilities.

No home is immune from fire, accident, illness or the like. There are many services for which the telephone is useful and convenient. Many who have discontinued their telephones still expect telephone service—*through their neighbors!* Can we sell the idea to everyone that the telephone is the cheapest, the most useful and the most convenient machine in the house when the value of service is compared with the cost?

A telephone saved, or a new telephone sold, is a distinct addition to the company's revenue. Places and persons called frequently by other subscribers might be used in influencing prospects to patronize the service. Lodge rooms, bus and railroad stations, hospitals, prominently-located filling stations are a few such places. Shopping by telephone has taken a phenomenal growth in many sections of the country. Advertised products are so much more conveniently ordered by telephone than milling around in crowded stores. In this day of so many bank robberies, vault telephones are a good telephone sales service.

The operators are in a position to help sell service to subscribers through toll talks. Many people do not realize it is easy to reach friends at different points at a nominal cost. An increase in toll business will be a distinct addition to the company's revenue as well as to the toll company. One progressive toll company sent cards to delegates at all hotels during a convention meeting in the city. This card informed the delegates of the rates at various hours—and a check showed 1,389 long distance calls during the convention.

Another problem of the telephone companies is to employ the right kind of publicity in order to point out the value of telephone service. Local newspapers should be used. A small, well-written advertisement run a few times a month will not cost much and will keep the telephone before the people. The nation-wide advertising campaign of the Bell System has done a great deal to make people realize how much they depend on telephone service.



F. R. Irons, of Woonsocket, Who Was Re-elected a Vice-President of the South Dakota Telephone Association at Its Convention Last Week.

Here are a few hints taken from other state conventions on the subject of advertising:

Publish a list of new subscribers in the weekly paper.

Visit the merchants and secure their paper sacks. On one side place a telephone advertisement.

Plan a series of letters suitable to season or conditions and enclose with letters sent out by merchants, thus cooperating, because every telephone disconnected means a loss to the merchant too.

Distribute a special employment directory listing the kind of labor and the people who will work and give their telephone number.

Make use of actual happenings showing necessity and value of a telephone, such as a fire, for instance.

At this time it might be well to give subscribers a little more service for their money.

In some localities the weather forecast and time are given every morning to the rural patrons. To this might be added the market reports on certain mornings.

Give extra listings in the directory without extra charge.

Allow use of a rural telephone for a few weeks saying: "Just use it until a man can get out to remove the instrument." Perhaps this will help save it. We must keep the fact before the farmer at this time that his telephone should be one of the last things he should consider to have removed because of the convenience and protection the telephone offers.

The essay contest campaigns arouse quite a little interest among the young people of the rural districts. We are in favor of all kinds of campaigns to sell service and educate the people along telephone helps. Manufacturers and dealers in other commodities conduct contests of all kinds to sell their goods, so why not the telephone companies? A telephone is not a luxury but a necessity.

Last Saturday, April 2, the big billion-dollar tax bill, incorporating several taxes that would hit the telephone companies, passed the House of Representatives by an overwhelming majority. This action concluded three weeks of battling and bitter debate. The bill was dispatched to the Senate, which body, being favorably disposed toward it, has begun consideration in committee hearings. We know the bill has President Hoover's approval, so our only hope is that the bill falls down in the Senate, which is doubtful.

President MacKinnon of the United States Independent Telephone Association is to be commended for his efforts of the last few weeks in trying to keep the tax on telephone messages out of the bill. If anyone has any suggestions of ways or means by which we could fight the bill, let us have them. Telephone service is needed to help general business out of the depression and to restrict its use will defeat the plans to improve the business situation.

George A. Scoville in TELEPHONY of January 30 says: "The telephone business is about the best business in all the world. Let's keep it that way."

In closing, I wish to express my appreciation to the Northwestern Bell Telephone Co., to the Dakota Central Telephone Co., and to the Central West Public Service Co. for the valuable services rendered the association; and to Thomas Phalen for his valuable help and suggestions. You know the secretary is really the active head of an organization. His duty is to serve you. This, Tom is always willing to do. Also to all the officers and directors who so ably assisted me during the year I express heartfelt thanks.

May I close with Ohio's slogan, 'Make 1932 a Good Year.'"

Following President Schumacher's report, Secretary Thos. Phalen, of Aberdeen, read his annual report for the year ending December 31, 1931.

President Schumacher then appointed the following committees:

Nominating: F. H. McGinnis, chairman; Charles E. Adams and Robert Aszmus.

Auditing: Grand E. Preston, chairman; Gust Quast and George Tollefson.

Resolutions: John A. Duff, chairman; Jay Houghtaling and J. O. Johnson.

Following the appointment of committees, O. R. Quinby, of Aberdeen, maintenance superintendent of the Dakota Central Telephone Co., was introduced to speak on "Proper Plant and Proper Plant Maintenance."

Mr. Quinby pointed out that each telephone company, large or small, should maintain a high standard of service at all times which is only possible through diligent maintenance of the plant and its equipment. To do this as economically as possible, he suggested dividing the plant into units and assigning a specific period of time to each unit, consideration being given to the season of the year best suited to the class of plant on which it is intended to work.

The division of the plant into units was suggested as follows: Poles, aerial cable and terminals, aerial wire, substation drops, substation instruments, and central office equipment.

During the winter months, the speaker stated, the city plant could be placed in first class condition as poor roads and working in severe weather to perform routines on the rural or toll plant would necessarily increase maintenance costs. Allowing a definite period of time to routine the city plant, the work can be planned and each unit properly and economically patrolled.

Replacement of defective poles is first on such a program, paying close attention to all poles to make sure they are properly guyed. Tree clearance can also be carried out in connection with this work. After aerial wire plant routine is completed, a close inspection of cable should be made, markers being placed, wherever trouble is found, for the cable splicer later on.

The rest of the routine should include close inspection of substation drop wire, which should be kept free from all hazards; substation sets, tests being made to locate any trouble; and a complete inspection of the central office, replacing worn parts in all apparatus, checking main frames, switchboards, ringing machines, etc.

Mr. Quinby's address will be published in full in a future issue of TELEPHONY.

R. A. Phillips, of Omaha, Neb., assistant to president, Central West Public Service Co., presented an interesting address on "Telephone Sales and New Business."

Mr. Phillips explained the importance of salesmanship in the telephone business and declared that it is more essential in times of adverse economic conditions than at any other time. "We can take lessons from other public utility companies in this respect," he stated in urging that telephone managers realize the importance of personal contacts in business promotion.

"Public Relations" was the subject of an address by Frank C. Builta, of Omaha, Neb., assistant to the president, Northwestern Bell Telephone Co. In his remarks, Mr. Builta pointed out the important place which the public relations part of business activity plays in the development of the telephone industry.

Following Mr. Builta's address, J. W. Raish, of Pierre, chairman, South Dakota Board of Railroad Commissioners, was introduced as the next speaker. His address on "Regulation and Management," follows in full:

Regulation and Management.

"There are three distinct elements which enter into, or collectively formulate, the relations between a public utility and the public which it serves: Management, regulation and litigation, represented by the exercise of the proper functions and prerogatives of the company, the regulatory agency and the courts. Each has its distinct and well-recognized functions or prerogatives, but the line of demarcation is not always clear.

Thos. Phalen, of Aberdeen, Who Was Re-elected Secretary-Treasurer, Was Especially Commended for His Untiring and Valuable Services to the Association and Its Member Companies Last Year.

Each of the three agencies mentioned is naturally somewhat jealous of invasions of its own proper sphere (as circumscribed by itself), and is inclined perhaps to magnify rather than to minimize or waive its claimed prerogatives.

Broadly speaking, the proper functions of these agencies may be termed, respectively: initiative, corrective, and protective. It is the right and duty of the company to initiate business policies, rules and standards of service, and charges or compensation for the service it renders or the commodity it sells.

It is the duty and function of the commission or regulatory agency to correct practices, rules and standards of service, and schedules of rates and charges, in the public interest, if, when and to the extent that a real interest of the public appears; in entire fairness and with the nearest possible approach to justice both to the legal rights and the best interests of the users of the service and the company which furnishes the same.

It is the proper function of the courts to protect the legal rights of both the producer and the consumer of public service.

In the final analysis, however, the courts assert their right to determine not only their own proper sphere, but those also of the two other agencies mentioned. The courts have even gone so far as to define and fix the line between management and regulation in many instances, and differently in each, so that the result is a considerable measure of confusion.

In the matter of rates, the three agencies are ordinarily agreed that it is the duty and privilege of the company to initiate and establish a system or schedule of rates and to so manage the property that its efficient and economical operation will earn and pay a reasonable return upon the proper investment of its owners; that the duty of the commission is to determine from time to time upon proper occasion whether or not an existing structure of rates and charges produce revenue sufficient for, but not in excess of, such requirements; in other words, whether or not such rates and charges are fair and reasonable alike to the utility and to the public which it serves.

The commission, in order to avoid invasion of the field of management, almost invariably determines and prescribes maximum rates. The adoption of the prescribed schedule, or of a lower schedule, is purely a matter of management.

Under ordinary circumstances the company is inclined to guard jealously its sacred rights of management. Particularly is this common when in a rate case construction costs or operating expenses are under consideration. But in times of stress as now, when unusually trying conditions confront your business and the business of the world, some companies are not disinclined to waive the prerogatives of management in certain respects; even to the extent of indulging in the old Spanish custom, or popular pastime of 'passing the buck,' with the commission playing the position of passee.

During the past year or two the utilities, and particularly the telephone companies, have been confronted with an exceedingly perplexing and delicate problem of management, with the solution of which no other agency is clamoring to interfere. Simply stated, this problem is whether or not the company shall accept diminished revenues by a voluntary reduction in charges, or by an involuntary loss of business.

This problem is solely and distinctly one of management. It is in regard to the consideration of this problem that some of our telephone companies have sought to pass the buck or evade the clear responsibilities of management.

Within the past year particularly, the

board has received numerous communications from telephone subscribers, or committees of such, stating in effect that due to present economic conditions, relief in the form of reduced telephone rental rates has been sought from certain companies but that such requests have been met with the misstatement on the part of the company, deliberate or otherwise, that 'Our rates are fixed by the South Dakota Board of Railroad Commissioners and we are powerless to grant relief.'

I know of no better occasion than this to dispel that illusion on the part of a few of the telephone companies of this state, if it really be an illusion. It is well, I think, to have a clear understanding of this situation. In this particular, it should be clearly understood that management may do voluntarily what regulation may not do by exercise of its legal authority.

The company may voluntarily reduce its rates, and consequently its revenues, to, or even below, the point of confiscation, but the commission cannot order a company to reduce its rates to a point where revenues will produce less than a reasonable return. An order of the commission resulting in confiscation would be promptly set aside by the courts.

Powers of Regulatory Body.

"The laws of this state provide that the South Dakota Board of Railroad Commissioners shall have power to fix individual rates, as well as to make schedules of *maximum* rates to be charged by any telephone company for the rent of any line or instrument, or for the transmission of any message, and for any service in connection therewith; that no change shall be made in any schedule of *maximum* rates by such board until after reasonable notice of hearing shall have been given to the company and persons interested therein, and a hearing has been had thereon; that no rate or charge for the transmission of any message or for any other service in connection with any line or exchange shall be *increased* without the written consent of the board entered in the journal of its proceedings.

In conformity with these and other provisions of law, all orders of the board in rate cases conclude with substantially the following language:

'That the (———) company be and it is hereby authorized to establish, file and put into effect, net telephone rental rates not to exceed the following:'

Then follows the authorized schedule of maximum rates. The company is authorized, but not required, to establish and put into effect a schedule of rates not in excess of the maximum prescribed. At the effective date of the order, or at any other subsequent time, the company may establish and file any schedule of rates equal to or less than the maximum, which the management may dictate. A schedule of rates once filed for the indefinite future, however, cannot be increased even to the authorized maximum without the written consent of the board.

Certain companies which have expressed a desire to grant to their subscribers some reduction in charges as a measure of temporary and emergency relief have been advised by the board that they may, if deemed expedient, file a reduced schedule of temporary emergency rates with a definite termination date, and that such restricted rates might legally revert to the former schedule upon the expiration date automatically and without action of the board.

While it is generally recognized, I believe, that in times of economic depression particularly, every reasonable effort should be made to enhance the value of the public's dollar by rendering service at the lowest practicable rates, it must be remembered that a change in economic conditions, either for better or for worse, does not change the law, nor the authority of a regulatory board or commission.

Assuming that existing rates are within the limits of reasonableness, as defined by the courts, relief in the form of reduced rates can only be afforded through the willingness of the company to voluntarily forego a portion of its return.

This, as stated before, is distinctly a problem of management. In its consideration caution should be exercised to the end that temporary relief, if considered expedient, may not result in permanently inefficient service through unduly deferred maintenance or inadvisable operation economics, for it is perhaps well to remember that, after all, the using public quite universally regards the continuation of efficient service of more importance than the charge for such service; provided, of course, that such charge, considering all circumstances and conditions, meets the test of reasonableness."

Plant Conference.

The plant conference on Wednesday afternoon, April 6, was conducted by L. S. Siekmeier, of Aberdeen, chief engineer, Dakota Central Telephone Co. Mr. Siekmeier discussed construction and maintenance of the telephone plant. During the course of the afternoon, many other interesting and instructive discussions were brought up.

"Play-O-Feen Crink-A-Nope."

On Wednesday evening at 8:00 o'clock, Sergius P. Grace, of New York City, assistant vice-president, Bell Telephone Laboratories, Inc., presented a lecture and demonstration entitled, "Play-O-Feen Crink-A-Nope." The latest developments in science and communications were clearly demonstrated to an assembly of about 3,000 persons.

A long distance call to the Cheyenne, Wyo., operator connected Mr. Grace with the radio dispatching station of the United Air Lines there and the conversation of a dispatching operator with pilots over Cheyenne was reproduced in the coliseum in Sioux Falls, S. D., where all present heard it.

Other features of the demonstration included the "inverting" of speech, which was reproduced through loudspeakers. Following this, a long distance call was placed to London, England, and in a few minutes, Mr. Grace was talking to Dr. R. W. King, London representative of the American Telephone & Telegraph Co. This conversation was also reproduced so that it was clearly heard in Sioux Falls.

The electrostatic projection of speech directly into the human brain was next demonstrated by Mr. Grace. Various other science developments closed the demonstration which proved unusually interesting and informative to all who were present.

Thursday Morning Session.

The session opened on Thursday morning with a commercial conference conducted by N. S. Spears, of Omaha, Neb., sales training supervisor, Northwestern Bell Telephone Co. He was assisted by J. P. Holland and A. L. D. Andrews. Mr. Spears outlined plans of selling telephone service and supplemental equipment and with the assistance of Mr. Holland and Mr. Andrews gave concrete examples as to the proper method of approaching prospective customers.

Examples of the usual conversations bringing out the wrong way and the right way of approaching prospective subscribers in order to sell service or supplemental equipment were also given. This conference proved very interesting and instructive to everyone present.

Visitors at the morning session were Geo. A. Kloidy, of Omaha, secretary, Nebraska Telephone Association; P. M. Ferguson, Mankato, Minn., Mankato Citizens Telephone Co.; W. F. Cozad, general manager, Northwestern Bell Telephone Co., and J. C. Nelson, district commercial superintendent, Western Union Telegraph Co. These men were called upon and addressed the convention briefly.

On Thursday afternoon, April 7, J. H. Agee, vice-president and general manager of the Lincoln Telephone & Telegraph Co., Lincoln, Neb., addressed the convention upon the subject, "Suggestions to Meet the Problems Before Us."

To illustrate his remarks, Mr. Agee used two charts, one showing the car loadings by the railroads of the country for the last three or four years. The other chart showed the development of stations by the Lincoln company for the last three years. The curves on the charts showed the actual decrease or increase as the case may be.

The next speaker after Mr. Agee was J. C. Crowley, Jr., secretary-treasurer, Minnesota Telephone Association, St. Paul, Minn., who spoke on "Looking Towards the Future." He reviewed the history of the telephone business during the last 25

(*Please turn to page* 40.)

Outside Plant Men Talk Things Over

The Telephone Foreman an' Spring Construction Accidents.

By JAKE, THE LINEMAN.

Mornin', buddies! This is sure one keen spring mornin', an' I'm sure glad ter see sich a bunch of you fellers on hand fer I think we're gonna have an interestin' session.

Have enuf of you fellers seen er heard of "Ole Man Accident"? I jist wonder what's happened ter the ole reprobate fer he's been as scarce aroun' these here parts as feathers on an elephant.

But jist 'cause you haven't see nor heard him, is no sign that you ought ter fergit yer "Safety Rules"—fer let me tell you that ole feller is still on the job ready ter trip you up ennytime that he gets a chance.

As I glance over the crowd I see quite a few fellers who are known, in their respective companies, as foremen. Some of you are splicin' foremen, line foremen, installation foremen an' central office foremen.

It's to you fellers that I'm gonna shoot my words terday, but it's gonna do all of you good to listen and remember what I'm gonna tell you; you might be a foreman yerself some day.

A foreman's job isn't any snap, no matter how you look at it. He has to keep everything movin' along at a pretty fair clip, so that his outfit turns out first-rate jobs at a pretty good rate of speed.

Ter do this he has ter see that all the material an' equipment are on hand fer the job an' that every man is puttin' out eight hours' work, day in and day out. He has ter keep things runnin' smoothly an' efficiently. If ennything goes wrong, he is the feller the management blames.

If an accident happens the foreman an' the employe involved are brought in on the carpet, an' if unsafe practices caused the accident, the foreman is blamed jist as much as the employe.

Some of you foremen have perhaps wondered jist why that is. Well, fellers, I've seen many a foreman put back ter climbin' poles jist because of somebody else's accident. To prevent this same thing happenin' ter you, I'm gonna show you why the management takes sich an attitude toward accidents.

One of yer biggest responsibilities is preventing accidents. Most companies put out safety instructions. It's up to the foreman to see that these instructions are thoroughly understood and implicitly carried out by every man under his supervision.

A foreman should educate each of his subordinates on how to perform every phase of his job in the safest manner known. He should plan each job so that it will be safely performed, fer after all safety and quality go hand in hand.

Yer company expects you to really put "Safety Rules" over to yer men, an' if you fail, an accident is bound to jump up sometime—an' who else is to blame?

Suppose you allow a truck to go out without a pike pole on it—a feller climbs a pole without "piking" it. If the pole breaks and someone is injured—aren't you to blame? Could you blame the management fer handin' you back yer spurs an' sayin', "Take these, learn 'Safety' an' maybe we'll boost you back up again"?

I don't think you would have any kick coming fer you had failed in your biggest responsibility—that of keeping accidents down, by makin' yer men do their jobs safely.

Now if you'll get out yer old note books an' pencils I'll show you a few things ter watch when you've got yer gang out on these spring construction jobs, rebuildin' pole line, stringing aerial wire, splicin' in cable, routining stations and cutting over new equipment.

Everybody rarin' to go? O. K. and the first signal is:

Make yer employes use the thermometer when they are heatin' paraffin. Don't let them rely on the unsafe, dipper test.

Always encourage your employes to report any hazardous condition which they may discover.

Keep "Safety Rules" always in the minds of your employes an' it's easy to keep your name off the accident list.

Encourage your men to give you enny ideas which they may have on "Safety."

See that your men are provided with all the safety devices that they need an' make sure that such devices are in first-class shape.

Always make sure that on every truck there is a first aid kit which is completely filled with everything yer men might need if an accident should happen.

Frequently a feller pretends he understands a "Safety Rule" because he's afraid he'll appear dumb if he asks questions. Make sure your men know just what you mean.

Every time a foreman loses interest in safety, the interest of his men also takes a slump. This slump usually causes a few accidents before it can be stopped.

Take a little time an' inspect all the ropes on your truck. Turn in all the defective ones.

Your men should know how to handle ropes. Many an accident is caused by faulty knots.

All unfinished work should be left in a safe condition. Pole holes should be covered, and all scrap material should be cleaned up.

How many times a month do you take time out and give your men a safety lesson? If you are not givin' them enny lessons, you had better start at once.

Are all of your men on the right job? If they're not, they're apt ter be dissatisfied and a dissatisfied man is not interested in his job or safety. Better study your men an' if you find any dissatisfaction, reorganize yer group until everyone is satisfied.

Be sure that you never push your men so hard to complete a job that safety is forgotten. Remember, "Haste makes waste."

Instruction of a new employe in the methods of preventing accidents is one of the first things a good foreman does.

Take yer job seriously—remember your bread an' butter depend on it.

Guess that's 'bout enuf signals, and I sure hope that you got some good out of them.

If you are one of the many foremen who do not give safety lessons to his men, take Jake's advice and start poundin' the lessons into yer fellers at once.

Here are a few points to remember when you are puttin' on a safety lesson:

1. Make sure that you know exactly what you are goin' to teach.
2. Get your men interested. Create in them a desire to learn.
3. Take up the lesson point by point and make sure each point is clear before you go on to the next.
4. After the final point has been explained, make a check and make sure that everyone thoroughly understands how to apply what you have said.

From now on, almost all of you fellers will be plenty busy—but don't get so busy that you forget "Safety." Well, I've got ter be a ramblin', but before I go I'd like ter leave our safety thought fer the week with you. It is:

A few minutes spent instructing a feller about the "Safe" way is a lot better than a few hours explainin' the accident!

Well, so long, buddies, I'll see you next Saturday, and I think it's gonna be test day, so study up!

Some Comments on the "I Wonder Why?" Articles

There is a saying that imitation is the sincerest form of flattery and so I am going to adopt or borrow Ray Blain's apt phrase and expatiate on some of his clever suggestions. I have often wondered why some enterprising equipment company does not handle some of the many articles he mentions and if they do, why don't they advertise the fact?

I would like to see one of those weather-

Choose Your Telep by Engineering

The four styles shown above, as well as the Monophone shown in the larger illustration, all utilize Bakelite in their construction.

HOW do you choose your telephones? Do you order a c make of instrument because you "always have"? Do yo out a telephone because it "looks good"? Or do you samples of the best the market has to offer, and make a definite, by-point comparison, scoring each instrument the way a research neer would do?

We suggest the latter method as being productive of a decisio will pay for itself a hundred-fold in user satisfaction, lessened up longer life and improved service generally. A score-card for co ing such a test should include appearance, lustre, balance of ha ease of handling, quietness of dial, strength of parts, non-slip base, and quality of cord. Also careful examination should be made as operation of the push-button switch, design and construction of mitter and receiver, quality of transmission, accuracy and reliabi dial, etc.

After completing and recording your comparative findings as instrument itself, make a thorough inquiry into the actual service re of different telephone companies—see just how various instru actually stand up in daily service.

We have complete faith that such an investigation will sho Monophone to be outstandingly superior. In fact, such tests have the basis of the Monophone's selection by hundreds of operating c zations throughout the world. Why not send for a Monophone a and make similar tests yourself—TODAY?

STROWGER AUTOMATIC DIAL SYSTEMS

Exclusive Sales Agents
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As modern as the skyscraper or the airplane, the Monophone is typical of the present age. Unsurpassed in technical design and performance, this instrument also is characterized by an unusual beauty and grace of line. It is available in standard black and colors.

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wers of Strowger Automatic Dial Telephone and Signaling Systems
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22, Rue du Verger, Antwerp, Belgium

When communicating with Automatic Electric Co., please mention TELEPHONY.

proof protectors. I imagine that it could be used to advantage in many places, especially where the premises are wired 'old style' and the protector is located under the house.

A tool for removing ground rods would pay for itself in salvage value and be an incentive to remove abandoned rods, especially those so poorly located that they may trip up somebody; what I would term a "safety last" location.

There is nothing so annoying and interfering as to force a busy operator, when acting as "Information" directory or toll rate operator, to lose time, looking through awkwardly-placed or poorly-assorted records.

Just recently I learned that black shells could be obtained for cord plugs. It would seem that the scheme to use colored cords would have an added value if the shell were the same color as the cord. It's the plug that the operator has to handle, and there is a lot of lost motion when an operator has to trace out a cord to prevent an incorrect disconnection.

I would also like to see a plug that does not require so much effort to fasten it to the cord, and a shell that does not depend on one screw, about the size of a pin head, to hold it in place. The plug with two screws at the far end is a slight improvement. When better-assembled plugs are made and advertised, telephone companies will buy them—especially, if it is left to the recommendation of the traffic department.

How many pliers and connectors are lost annually, just because they are about an inch too long to lie flat in the hip pocket?

The world may beat a pathway to your door,
If you have a better mouse trap for sale;
But the path will soon grow up in weeds, galore
And be lost to view, down the vale.

So, if you want to be lost, of the world forget,
Just fail to advertise and you'll win, by heck!

Lenox, Ga. J. F. BRADY.

Hanging a Manhole to Avoid Service Interruption.

A manhole of the Southwestern Bell Telephone Co., in Houston, Texas, now hangs in the air. Nevertheless, its position has not changed.

Explanation for its complicated situation is found in the fact that an excavation for a storm sewer, some 16 feet deep and 7 feet wide, approached from either side, threatening to completely engulf the 8-foot by 5½-foot by 3-foot concrete manhole.

Engineers and construction men foresaw the difficulty, however, and conferred with the sewer contractor. Thereafter two telephone poles were laid across the line of excavation; steel cables were passed from the poles and under the manhole, to make a sling.

The contractor's ditching machine scooped to within a few feet of the concrete cube on either side; then shovelers dug away the earth beneath and surrounding it.

As a result of this foresight and preparation, there was no damage to plant, and there were no service interruptions. The manhole will remain suspended in this position until the sewer is finished and the job filled in.

That Old Cable Splicing Gang; Some of Their Jokes.

By THE OLD CABLE SPLICER.

Back in the early days of the telephone game all lines were strung with open wire; and when systems grew larger, these open-wire leads increased to impossible proportions. Then cable developments brought a sudden change over from the troublesome open wire to complete exchange cable systems.

Large construction gangs were popular in those days, and it was not uncommon for ten or more splicing crews to be working in one exchange at the same time. We would splice physical cable during the daytime and then splice verbally long into the night. Then on other nights we would shoot craps or play poker.

Boomer cable splicers were quite numerous in those days when there were no unemployment problems and help was always scarce. They would come on the job, work a few days, draw their pay and be on their way. I remember one such boomer well. He came on the job and the foreman put him to work making some straight wild splices. He wiped a nice-looking joint and made good progress for a few days, when he suddenly called for his time and blew.

We started testing and tagging a few days later and found that we could not get anything through the section our boomer friend had worked on. We opened one sleeve and found that he had omitted the small item of splicing the conductors. We found this to be true of each splice he had worked on.

The boomers never had any interest in the job; just to work a few days and pass on was their goal, which is probably the reason they have all passed on out of the picture.

We lead daubers worked hard in the old days on construction work, but we also had a lot of fun among ourselves, even though most people claim we have always been a temperamental bunch like opera singers.

It is true that anyone especially skilled in any particular line which is considered rather difficult, or dangerous, may develop a sort of superiority complex. For instance, it is claimed by some that steeplejacks are most difficult to get along with when sober. Cable splicers, although skilled, are so numerous today that they just do not find it worth the trouble to be "high hat."

One day the foreman sent a big tall lanky splicer named "Heinie," with his helper, over to another exchange to clear some trouble. While he was packing up we slipped ten big paving bricks into his canvas tool bag. He rushed for the train with the heavy bag pulling him sideways, but did not have time to stop and investigate the weight.

When he unpacked at the other exchange he discovered the bricks, and was surely one wild Dutchman. He called the foreman long distance to inform him what he thought of the entire gang. He was, however, in a good humor when he returned to the big job and laughed with the rest of us over the joke.

A bunch of us were sleeping in a large room and one old chap used to talk far into the night, or as long as anyone would answer him just occasionally. We had gas lights in those days. One night we were all in bed when this talking pest came in, so we faked sleep. He talked while he was getting ready for bed without receiving a bit of response from any of us.

Then he casually went over and apparently blew out the gas and crawled into bed. The rest of us came out of our faked sleep mighty sudden and flocked around that gas jet like a bunch of moths. We found it was turned off. What he had done was to turn out the gas and give a big blow at the same time—and we all bit nicely. The joke was on us and we never faked sleep on him again.

Special Subscriber's Set Eliminates Use of Hands in Operation.

An arrangement which eliminates the necessity of using the hands in answering or making a telephone call has been devised by the engineering department of the Rochester Telephone Corp. of Rochester, N. Y.

The essential features are a foot switch and a wall set with the receiver on a bracket mounting so that a person can talk while standing. A locking device makes it possible to keep the foot switch operated if a person desires to leave the telephone temporarily. A slight touch of the locking lever restores the circuit to normal.

The idea was originally conceived as a result of the request of hospital authorities for some kind of a telephone set that could be operated even though the hands were not prepared to touch anything. Emergency calls for doctors in the operating room engaged in operative work was given as the reason for the hospital's unusual request.

Since that time several other types of establishments, such as the county morgue and undertakers, have found this to be a desirable arrangement.

Transmission in the Telephone Plant

Discussion of Problems in Magneto Exchanges Which Concern Transmission Performance — Part IV, Substation Equipment Maintenance — Illustrated Address Before the Annual Convention of Minnesota Telephone Association

By H. B. Nelson,
Northwestern Bell Telephone Co., Minneapolis, Minn.

Our next subject for discussion is substation equipment. The substation equipment is the generating station for the voice current. The satisfaction of the telephone service depends to a large extent upon the efficiency of this equipment. Studies of subscribers' reports and reports involving poor transmission show, however, that substation equipment is responsible for over half of the troubles.

Some of these troubles are minor in nature but they interfere greatly with the subscriber's service and, from that standpoint, require constant attention. The character of the initial installation job largely determines the station's susceptibility to trouble, and a little extra effort at the time of installation may result in later economy and better service.

A good dependable instrument and associated material should be used at all times and be properly installed and tested before leaving. The apparatus and wiring should be securely attached, free from loose connections and not exposed to mechanical and electrical hazards. The instrument should be located in a convenient and accessible place, yet as free from noise as possible.

The location of the instrument should make it possible for those using it to talk directly into the transmitter with their lips approximately one inch from the mouthpiece.

All telephones should be visited and thoroughly inspected and tested at least once each year in order to properly maintain the equipment and wiring in the best possible condition.

This test should include the operation of the switchhook, a test for noisy cords, ringing and hand generator operation, protection, and a talking or transmission test with the operator or wire chief so that the installer or repairman can assure himself of the satisfactory operation of the receiver and transmitter.

The talking or transmission test should be made over a special test circuit which can be installed either in the wire chief's desk or the switchboard. The circuit which is shown in Fig. 41, consists of an artificial line in which a transmission loss of 15 db is introduced into the circuit.

Any exchange line which, when connected to this circuit, will not produce a satisfactory grade of transmission between the central office and the subscriber will be sure to produce transmission complaints when connected to long-haul circuits. It forms a sure and convenient means for detecting unsatisfactory transmission conditions on exchange stations and should be a part of the testing equipment in every magneto office.

Stations which fail to produce satisfactory transmission when connected to this test circuit should immediately be investigated and the cause of the failure removed. Let us now consider the principal items that should be covered by inspection whenever a station is visited.

1. Protector:
   - a. Protector block.
   - b. Fuses.
   - d. Protector ground.
   - c. Ground wire.
2. Inside wire.
3. Subscriber's set:
   - a. Terminal.
   - b. Ringers.
   - c. Magneto.
   - d. Switchhook.
   - e. Cords.
   - f. Transmitter.
   - g. Receiver.
   - h. Battery.

Several of these items are so often a source of transmission trouble that they will warrant special consideration.

Switchhook contacts should be cleaned with a burnishing tool and the springs adjusted so that they have a perceptible follow. A poorly-adjusted switchhook will cause a noisy cut-out when the instrument is jarred.

Defective cords are often a source of transmission trouble. In cords that have been badly twisted or that have been wet, the tinsel conductor breaks down causing a high resistance or cut-out when the cord is moved. This can be heard in the receiver when the cord is moved about. All defective cords should be replaced as soon as detected.

Transmitters that are noisy or packed should be replaced. "Packing" is caused by the breaking down of the carbon granules in the transmitter button, and if allowed to remain in service will be sure to result in transmission complaints.

No attempt should be made to repair or adjust the internal parts of the transmitter as this requires laboratory equipment to accomplish a dependable job.

Defective mouthpieces that have become cracked or chipped should be replaced. In replacing a mouthpiece, be sure that none of the chips has lodged between the diaphragm and the transmitter face as this will cause a serious transmission loss.

Many of the transmission reports are traceable to simple defects in the telephone receiver and an intimate knowledge of its construction will aid the repairman in correcting these faults.

The receiver, Fig. 42, consists of an electromagnet attached to a permanent magnet. The diaphragm is held in place over the poles of the electromagnet by the receiver cap. The incoming voice current varies the field of the permanent magnet and causes the diaphragm to vibrate and produce a sound wave of similar characteristic to the voice current.

In order to operate efficiently the permanent magnet must have sufficient strength to support the diaphragm when the cap is removed and the receiver inverted. When the magnet is too weak to pass this test, the receiver should be replaced.

When the receiver is completely assembled the air gap between diaphragm and the pole pieces is so small that any accumulation of filings or rust will cause an

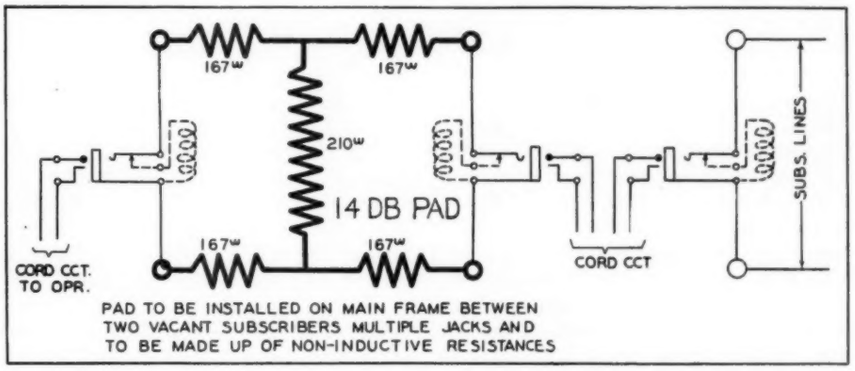


Fig. 41. A Special Testing Circuit Which Is Used in Determining the Quality of Transmission on Subscribers' Lines.

appreciable transmission loss. This adjustment is very critical and is permanently fixed at the factory for most makes of receivers.

Due to the pull of the permanent magnet on this diaphragm a loose or cracked receiver cap or a broken shell will permit the diaphragm to sag until its center rests on the pole pieces. This retards the operation of the diaphragm to such an extent that good reception is impossible.

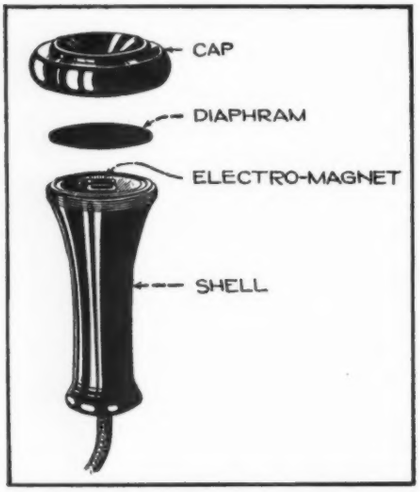


Fig. 42. Main Parts of the Receiver.

Defective caps or shells should be replaced and loose caps tightened as soon as discovered.

In order to protect the pole pieces and diaphragm from rusting, they are given a protective covering of lacquer. The side of the diaphragm that is always placed next to the pole pieces is covered only with a very thin coat and can easily be recognized by the color of the metal showing through the lacquer. If the heavy-lacquered side of the diaphragm be placed next to the pole pieces, the air gap between the metal diaphragm and the pole pieces will be increased and the efficiency of the receiver lessened.

In removing the diaphragm for inspection, be sure to lift it off as sliding it across the pole pieces will destroy the lacquered surface and later result in rust forming on the diaphragm or pole pieces. Diaphragms that are rusted, dented or bent should be replaced as they will not work efficiently.

In reassembling the receiver, all traces of dust and dirt should be carefully wiped from the diaphragm, pole pieces and seating edge of the receiver cap and magnet cup. Should particles of dirt be allowed to remain on the edge of the diaphragm or seating edge of the receiver cap or magnet cup, it will permit the edge of the diaphragm to vibrate and destroy the smooth quality of the sound wave.

The most common source of trouble with local battery telephones lies in the batteries. These troubles include an insufficient number of cells, wrong type, connected wrong, loose connections, not protected against dampness or mechanical injury, or completely worn out.

Experience and studies indicate that good dependable, uninterrupted telephone service requires a reliable type of dry battery especially designed for telephone service. The number of cells should conform to the manufacturer's specifications for the particular instrument in which the batteries are to be placed.

Subscribers differ in the amount of usage of their stations and the life of the dry cell is proportionately varied. The volume of outgoing transmission depends on an adequate current supply.

In order that the battery supply may be properly maintained, batteries should be tested with a battery gauge whenever a station is visited and all defective cells replaced. The battery gauge shown in Fig. 43 is a special ammeter which is provided with a resistance winding of 5 and 15 ohms connected in series with the test leads to prevent injury to the battery when short-circuit tests are made.

Flash tests made with a standard ammeter do not reflect the true condition of the battery; and if the full current is permitted to flow through the ammeter for any appreciable time, the life of the battery will be shortened.

This gauge is designed for testing three cells in series. If a single cell is to be tested, the stem of the gauge is depressed, and the 15-ohm winding is shunted out so that a correct reading is obtained on one cell. The scale is calibrated to show the cut-off points below which batteries should be replaced in the various types of service in which dry batteries are used in the telephone industry.

In order to maintain good transmission it is necessary that a definite plan be set up in all magneto exchanges for testing and eliminating run-down dry cells before the service is impaired.

The necessity of an adequate battery supply has been stressed and I wish now to point out the dangers to good transmission of using a greater number of dry cells on the telephone than is specified by the different manufacturers for their telephone instruments.

There are a number of good telephones on the market that require only two dry cells for the proper operation of their transmitters, while others require three. When the number of dry cells is increased beyond the amount specified by the manufacturer for his instrument, the following conditions take place:

1. The side tone of the instrument is increased to such an extent that it makes it difficult to hear over the telephone.

2. This increased battery supply causes the transmitter to burn and fry. This will sooner or later destroy the transmitting qualities of the instrument and result in the transmitter packing, which will make its replacement necessary.

In investigating transmission complaints, this condition has usually been found at stations where the telephone user has to supply his own dry cells. It was found to be the result of the use of a special ignition battery unit which goes under the trade name of "Hot Shot Batteries."

These batteries are manufactured in four, five and six-cell units that are sealed into a single case and are manufactured especially for gas engine ignition. When used on the telephone, they supply battery at from two to three times the volume required for the proper operation of the transmitter and invariably result in an injury to the transmitter.

Individual ignition cells, when used in the proper number, will not injure the telephone; but from an economical standpoint they are not as good as those dry cells which are especialy designed for telephone purposes.

The telephone dry cell will give from three to nine months longer service than the ignition dry cell when used for telephone service and is, therefore, the most economical to buy.

(To be concluded.)

Southwestern Bell Employe Colds Cost Company $46,000.

Colds and other respiratory diseases cost $46,000 or 15 per cent of the $336,685 of sickness disability expense paid by the Southwestern Bell Telephone Co. last year, the general employes benefit committee of the company announced late in March.

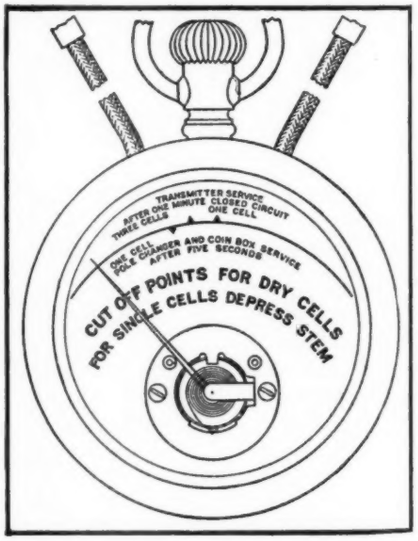


Fig. 43. Special Watch-Type Battery Gauge for Testing Dry Cells.

The announcement, issued as a comment on a formal annual statement, certified by Wallace W. Draper, traveling auditor for the American Telephone & Telegraph Co., points out that the 15 per cent directly traceable to seasonal respiratory diseases almost equals amounts paid for death benefits and is more than double the accident benefits paid during 1931.

Here and There in Telephone Work

"Hour Glass" Now Useful Desk Ornament in Bank.

Recent visitors at one of the largest banks in Wall Street, New York, have been mystified to note that many desks are decorated with what at first glance appear to be tiny hour-glasses. They are three-minute glasses, to be exact, since the sand takes just that long to run from one end to the other.

The visitors noted that occasionally a man will reach for the telephone with one hand and for the "hour-glass" with the other. Here is the explanation:

It seems that the bank officials were a little distressed to find, on checking up in the interest of economy, that employes making long distance telephone calls frequently remain on the wire a few seconds after the initial three-minute period and consequently were charged with another minute.

It was found that a trickle of sand aided the communicator much more than did his watch; hence, the fascinating little toys on the desks in the counting house.

Private Branch Exchange Current Supply; Ringing Power (Ctd.)

By JOHN A. BRACKEN.

The flow of direct current through a given circuit is opposed only by the ohmic resistance, but the flow of alternating current in the circuit is opposed by the counter E. M. F. of self-induction as well as ohmic resistance.

Furthermore, the current induced in a conductor begins at the surface and rapidly diffuses inward; that is, when an alternating E. M. F. is applied, the current started by a positive impulse has only time to

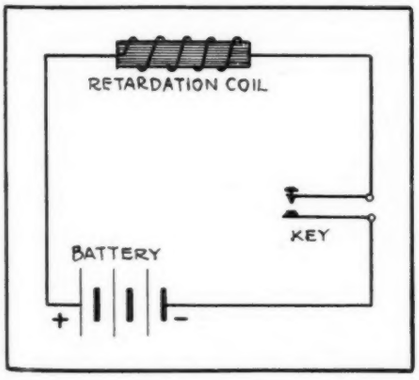


Fig. 1. A Type of Circuit Which Would Show a Momentary Effect of a Retardation Coil.

diffuse a short distance from the surface before the succeeding impulse starts an opposite current from the surface.

The effect is that the current never attains its full value. A conductor, therefore, offers greater resistance to alternating than to direct current.

By self-induction is meant induction produced in an electric circuit by the induction of the current on itself at the moment of starting or stopping the current therein. This action of self-induction in an electric circuit can be compared to the action of water flowing through a pipe. When the pipe is opened at the faucet, the water holds back for an instant. It takes a little time for the water to get going and for the stream to come up to full strength.

If the faucet is suddenly closed, the water tries to flow on and bumps the pipe, or causes what is known as a "water hammer." This hammer may in some cases be sufficiently violent to burst the pipe, and it is for this reason that an air cushion is provided by means of a short extension of the pipe above the faucet. The air cushion takes the bump due to the inertia of the water when the faucet is quickly closed.

This inertia of the water is in some ways like self-induction in the electric circuit. By inertia is meant that property of matter by virtue of which it tends to remain at rest, if resting, or to move uniformly in a straight line, if in motion.

The effect of self-induction in a direct current circuit is only momentary, the effects being observed only when the electric current is changing in value such as would occur when the circuit is closed or opened. Consider the circuit as shown in Fig. 1. The presence of the coil retards the flow of current when the key is closed and tends to prolong it after the key is opened.

If the battery were to be replaced by an alternating current generator, there would be a constant opposition to the alternations of current; that is, the counter E. M. F. self-induction of the coil would retard an alternation from reaching its maximum amplitude (the distance which the electric current moves in performing a complete alternation) and would also tend to delay it from falling to zero.

Having an understanding of the action of capacitance and inductance in the form of condensers and reactance coils, or as more commonly-called, retardation coils, it may be shown how they operate as a filter circuit. Take the case of Fig. 2. In the conductor at the left both direct current and alternating current flow along through the same conductor. Then the circuit divides, one part being connected to a condenser, the other to a retardation coil.

Due to the dielectric—that is, the substance which separates the sheets of tinfoil in a telephone condenser, being an insulation insofar as the direct current is concerned—the direct current cannot get through the condenser. But the direct current can flow through the winding of the retardation coil with only the ohmic resistance of the wire to oppose its flow.

So the direct current follows the path through the retardation coil and avoids the path through the condenser. But when the

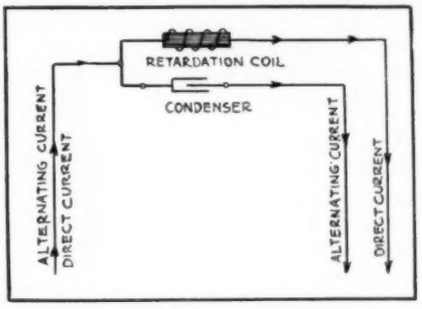


Fig. 2. A Simple Illustration of the Principle of a Filter Circuit.

alternating current attempts to flow through the retardation coil, its alternations produce a strong electromagnetic field around the coil, and the counter E. M. F. set up in the coil windings so opposes the alternating current that it finds great difficulty in getting through.

The condenser in the circuit, if of large capacitance, offers little opposition or reactance to the alternating current effect. So the alternating current takes the path through the condenser, so to speak, and avoids the path through the retardation coil. At the right side of Fig. 2 the two kinds of current, direct and alternating, have been separated by the retardation coil and condenser, each going its own way.

Subscribers Who Move May Retain Old Telephone Number.

The Northwestern Bell Telephone Co., which has been changing over service in Omaha, Neb., from manual common battery to dial, has adopted a system of random assignment intended to please subscribers whose telephone number has been held so long that it has become a family institution, like an automobile license number.

If a subscriber moves to another part of the city he may have his number follow him, so long as his removal does not take him out of the territory served by the Webster, Harney, Atlantic or Jackson exchanges. This takes in a very large section of the city.

Kenwood numbers in North Omaha and Market exchange numbers on the south side will retain their individuality, while Walnut and Glenwood exchanges find their numbers straying into each other's territory since the new plan was adopted.

This disappearance of sharp territorial

lines between telephone prefixes became effective recently when the old Webster and Harney exchange buildings were abandoned. These exchanges now operate as separate units in the main headquarters building at Nineteenth and Douglas streets, Omaha.

More Business — A Column of Business-Getting Ideas.

In this column each week we present some of the latest telephone sales promotion advertising and publicity ideas. Details of the plans and ideas suggested here may be obtained by writing to the editor of TELEPHONY, 608 South Dearborn street, Chicago, Ill.

* * *

In many towns where motion picture theaters are open on Sunday the following plan has resulted in much additional business for telephone companies and has met with the entire approval of theater managers:

1. Secure from the theater manager the list of towns in his immediate trade territory.

2. From this list indicate to the manager of the theater the number of rural subscribers that can be reached by line calls in the towns he wishes to advertise coming movie attractions.

3. In case the telephone company does not operate in all of the towns which the theater manager wishes to reach, the local company will arrange with the connecting company to place the calls.

In towns where this plan has been in effect, the most successful results have been experienced by placing two line calls before each feature production of the theater—one call on Friday and one on Saturday. This plan has also produced successful results for local merchants who wish to advertise some special sale.

* * *

Any telephone company does just the right thing when it encloses samples of its advertising and sales literature along with the dividend checks sent to stockholders. Stockholders in many instances provide excellent prospects for many of the services the company has for sale.

* * *

Spring and summer is the logical time to conduct a campaign among members of rural school boards to place telephones in those rural schools which do not already have telephones. Advance sales effort on the part of the company in many instances results in the sale of telephone service in the fall when school opens. Copies of folders, letters, and newspaper advertising which have proven successful in such a campaign may be secured from the editor of TELEPHONY.

* * *

The proper suggestion at the right time often results in a sale. With this as a guide, several telephone companies have placed calendars under the glass on the writing and dressing tables in hotel rooms. These calendars are illustrated, showing a home scene. The printed copy calls the room occupants' attention to the low cost, speed and joy of calling friends and dear ones by long distance. The calendars are changed every three months.

* * *

A unique plan to encourage the use of long distance service for people away from home is presented in the following paragraphs:

1. Clip names from the personal items columns and society pages of daily and weekly newspapers concerning persons visiting in the town where the telephone exchange is located.

2. Paste each clipping on the telephone company letterhead.

3. Write the following letter and mail it to the person mentioned in the newspaper clippings. Be sure to address the letter in care of the person whom the out-of-town guest is visiting.

Dear Mrs. Jones:

Here's something about you from the newspaper.

We are glad you have come for a visit —and are taking this opportunity to suggest that you use the long distance telephone to keep in touch with those at home while you are away.

Long distance "is the most rapid, personal and convenient way to maintain contact with anyone, anywhere, at any time."

When you call the folks back home, just ask the operator to have the call placed on your regular telephone bill at home. When you make a three-minute call and will talk with anyone who answers the telephone call at your home, the charges are:

Day Rate—4:30 a. m. to 7 p. m., ——
Evening Rate—7 p. m. to 8:30 p. m., ——
Night Rate—8:30 p. m. to 4:30 a. m., ——
The person-to-person rate, which is the same at all times, is ——————.

Very truly yours,
JOHN DOE,
Manager,
Happy Hollow Telephone Co.

Suggestions for Advertising Slogans Submitted by Readers.

We have been using a slogan for quite some time, which seems to me catchy and to the point. It is: "A Telephone in Your Home for Only a Few Cents Per Day—Convenient, Necessary."

I think a real catchy slogan that could be used universally by all of us would have some effect on the public; something like the flour manufacturer uses, "Eventually, why not now?" Something on that order, referring to our business, ought to help all of us to some extent.

EARL F. STICE,
Altamont, Ill. General Manager,
National Trail Telephone Co.

* * *

I have been interested in the suggestions for a telephone slogan; one that will be a constant reminder of the telephone. "Whenever you see an arrow—think of Coca-Cola" is a slogan that was used for years.

I would suggest:

"There Is No Economical Substitute for the Telephone."

"Don't Drive—Telephone; Save Money—It's Useful."

R. E. DUTCHER,
Pierce, Neb. Manager,
Pierce Telephone Co.

* * *

My suggestion for an advertising slogan is:

"Haste Without Waste—Telephone."

Haste: In calling police, time saved.
In calling fire department, time saved.
In calling doctor, time saved.
Business deals closed without delay.

Waste: Time lost sending for police—danger.
Time lost sending for doctor—death.
Time lost sending for fire department—property lost.
Time lost writing or telegraphing in business deals—deal closed by telephone.

10525 Carnegie Avenue, J. B. BUTLER,
Cleveland, Ohio. Ohio Bell Telephone Co.

Program of Kansas Convention Promises Interesting Two Days.

The program for the 32nd annual convention of the Kansas Telephone Association, which is to be held at the Jayhawk Hotel, Topeka, Tuesday and Wednesday, April 19 and 20, lists some very able speakers who will cover a variety of subjects of interest to telephone people.

Tuesday morning will be devoted to registration of convention visitors and renewing old acquaintances, as well as an inspection of exhibits. At noon, there will be a luncheon of officers and directors of the association.

The first convention session will be held on Tuesday afternoon, April 19, at 2:00 o'clock. Reports are to be given by Secretary H. B. Couch, of Topeka; Treasurer V. E. Chaney, of Kansas City, Mo., and President Samuel Tucker, of Pleasanton. Convention committees will be appointed.

A. R. MacKinnon, director of service sales, Telephone Bond & Share Co., Kansas City, Mo., will discuss "The Problems of Today," which will be followed by a general discussion led by Fred Coulson, S. W. Black and I. F. Krehbiel.

The Topeka Chamber of Commerce will entertain the convention delegates at a theater party Tuesday evening.

The first speaker on the Wednesday morning program will be Thurman Hill, member of the Kansas Public Service Commission, who will talk on "Depreciation for Telephone Companies." He will be followed by Dr. Burris Jenkins, minister

(*Please turn to page* 40.)

With the Manufacturers and Jobbers

Reliable Electric Co.'s Record of Development Work.

During the past year, in spite of the general business conditions, the Reliable Electric Co. of Chicago has successfully carried out many new developments in its line. It has endeavored to keep pace with the ever-increasing demand for new and more efficient types of telephone protection.

These recent developments include the No. 1000 outdoor substation protector, two and three-point porcelain connecting blocks, the heat-coil re-set panel and test plug for the Reliable No. 303-H switchboard protectors, the "RU" unprotected cable terminal in sizes 11, 16 and 26 pairs, the "P" and "R" drop wire clamps for dead-ending twisted pair drop wire, the No. 222 ten-point crossarm protector and the Serjdetour protector for power company communication circuits.

All of these devices are now in production and on the market. At the same time further development work is being carried on in the plant. The Reliable Electric Co. feels that it is progressing along with the telephone industry and intends to continue to keep its name in the forefront of all that is modern and efficient in telephone, switchboard and cable protection.

New Standard Typewriter Announced by Burroughs.

A new standard typewriter that contains a number of exclusive features has just been announced by the Burroughs Adding Machine Co., Detroit, Mich.

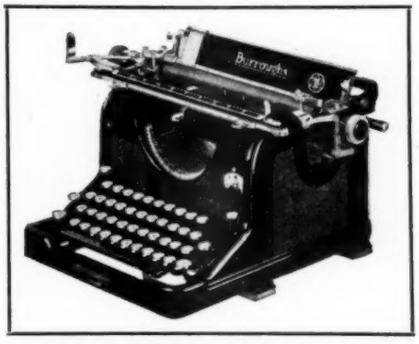
The new machine is of distinctive appearance and pleasing design. It is finished in black enamel, with black crystal panels at sides and back, and chromium-plated fittings. The mechanism of the machine is almost completely enclosed, a feature that protects it from dust. It is of sturdy construction throughout, benefiting from the precision-manufacturing methods developed by this company for other types of office machines.

A light, positive key-touch is an outstanding feature of the new typewriter. By an exclusive method of balancing the type-bars a smooth, direct action is obtained that permits fast, accurate operation.

The carriage of the machine also presents a number of new developments in typewriter construction. In most cases these refinements, which include a rigidly-controlled carriage, a new type of variable line spacer, and a new paper-feed construction that permits writing to the exact bottom of a sheet, are features taken from Burroughs bookkeeping machines.

Another feature of the new typewriter is the shift. It is known as a balanced shift in which the carriage remains stationary and in which the platen alone is shifted. This permits a more durable carriage construction and tends to increase its length of service.

Other features include a shift-lock on both right and left shift keys, front margin stops and scale, an 11-inch platen with 10-inch writing line on a standard width carriage, ball-bearing rollers, and a new, positive back-space mechanism.



The New Burroughs Typewriter.

Kellogg Magneto Switchboard in Service for 31 Years.

Not long ago, O. B. Bourne, Kellogg representative at Kansas City, Mo., received a Kellogg magneto switchboard that had recently been removed from an active exchange because larger switchboard capacity was required.

The plate on the board bore the number 85. Upon checking back, records showed that this 150-line Kellogg express type magneto switchboard had been originally sold to the Sparta Telephone Co. of Sparta, Ill., on April 3, 1901—just 31 years ago.

The switchboard was still in working condition when taken out—a real record of service.

The Trouble-Shooter and the Small Automatic Exchange.

By H. H. Hitchcock,
The Summit Telephone Co., Copley, Ohio

The trouble-shooter and outside plant men have new problems to face, as well as the men higher up in the organization, due to the progress of the times. To him they are just as important and appear just as difficult as problems of rates, taxes and finance do to the executive.

Perhaps my experience with one of these problems will serve to give encouragement to the trouble-shooters and confidence to the executives, who are facing the small automatic exchange problem.

One day about two years ago, our manager informed the writer that he wanted me to attend the annual convention of the Ohio Independent Telephone Association and see the All-Relay automatic switchboard on exhibition there, of the type which we were going to install in our Granger exchange. He further told me that I should learn all I could about this switchboard while there, as it would be "my baby" when installed.

Well, you trouble-shooters can imagine how elated I felt about that time; not knowing any more about an All-Relay automatic switchboard than I did about flying. I knew how to handle 8-inch pliers, spurs and the like, and had a working knowledge of magneto and common battery telephones and switchboards; but I thought an automatic switchboard was out of my class.

Well, I attended the convention and spent several hours watching demonstrations on the All-Relay switchboard. The men in charge of the exhibit explained the operation to me several times. By the time I went home I understood it fairly well and was sure I could "get away with it," especially since I had been assured by others at the convention who were operating All-Relay switchboards that trouble was so infrequent that detail knowledge of the circuits was unnecessary.

During the next month or two I mounted dials on the 150 magneto telephones connected to our Granger exchange, and when the switchboard arrived, helped with the installation and testing. To my surprise the All-Relay switchboard operated just as it came out of the box and no tinkering was required. So I had no chance to gain experience from tinkering, but felt sure if shipment did not put the board out of adjustment, little maintenance would be required due to ordinary use.

Since the cutover my switchboard work consists only of care of the battery and charger and testing the ringing machine. The switchboard has been in operation about two years and I have had only one occasion to hunt trouble on the switchboard, and that turned out to be a broken wire. This wire was located by comparing operation with adjacent equipment and was not difficult.

As for switchboard maintenance, it is much less than I had with the old magneto board with its cords, plugs and keys. As for the outside plant trouble, I can see no difference in the amount, as the All-Relay board will operate with about the same amount of ground leakage as the old magneto switchboard.

Thus my big problem turned out to be a help, and I am hoping that our company will see fit to install another small automatic switchboard at the other exchange under my maintenance.

Missouri Exchange Turns Common Battery

Scotia Telephone Co., of St. Louis, Mo., Erects New Building and Installs New Equipment at Its Washington, Mo., Exchange—Four-Position Switchboard and Other Equipment Installed—History of Town Shows Its Steady Growth

By P. Winemiller, and J. P. Galligan,
Sales Engineer, *Missouri Representative,*
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

The Scotia Telephone Co., St. Louis, Mo., of which P. Kerr Higgins, a man well known to all pioneers in the industry, is president and general manager, owns and operates numerous exchanges not only in the eastern part of Missouri, but also in Oklahoma and Texas.

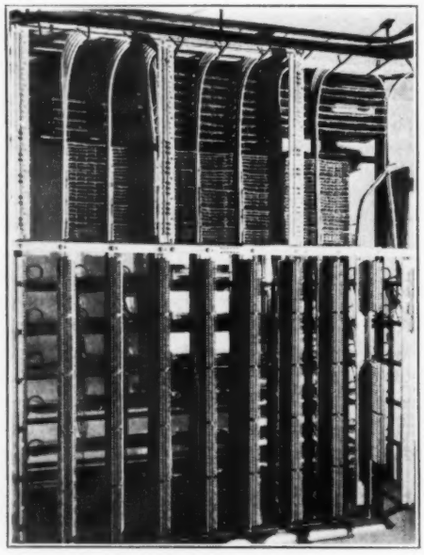
It being the policy of the Scotia company to keep all of its exchanges in first-class shape and to give good telephone service, it recently finished the complete rebuilding of its Washington, Mo. exchange. This rebuilding applied not only to the central office equipment, but to the entire outside plant as well. Switchboards and associated equipment together with all instruments were furnished by the Stromberg-Carlson Telephone Mfg. Co.

While the accompanying views give a very clear picture of the central office equipment, it is thought that a description of some points of this installation would be interesting to operating men and women.

The switchboard consists of four positions, each position being a unit in itself and of the well-known Stromberg-Carlson No. 3 steel frame sections. The local lines, arranged in an associated multiple, employ the use of the standard Stromberg-Carlson No. 190 type line and cut-off relays, of which there are now more than 125,000 sets in actual operation.

This type relay was developed by engineers of the Stromberg-Carlson company and placed on the market in 1912. At the time of its introduction, it was such a departure from the old conventional type of line and cut-off relay that it caused considerable comment. Being such a decided step forward, the telephone operating people were a little slow to consider it. Its performance since is a positive guarantee of what may be expected from it.

All toll and rural lines are lamp-ended, the rural lines being so arranged that code rings on the line are faithfully indicated to the operators. The toll lines appear in front of the toll operating position only, while the rural lines are accessible to all positions, there being lamp and jack multiples of these lines, making them available to all operators.

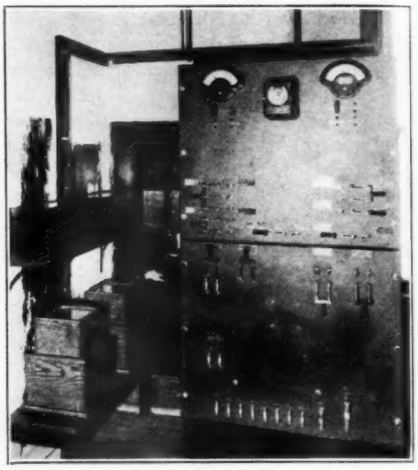


Stromberg-Carlson Combination Main Frame and Relay Rack.

Hugo Palisch, Washington, Mo., Manager of the Scotia Telephone Co.

Incorporated in rural lines are features making it possible for them to be interconnected, either to other rural lines or to local lines, with the use of simple local cord circuits only. There are no universal cord circuits on the board, with the exception of those in the toll position. These are of the high efficiency type, employing the use of 48 volts on local connections.

The local cord circuits employ these features, which are standard with the Stromberg-Carlson company: Machine ringing, reverting tone, instantaneous generator cut-off, flashing recall and secret service on local to local and rural to rural.



Power Equipment Installed at Washington.

While this equipment is new to the Washington operating force, they have already handled considerably over 300 calls per position per hour.

All cord circuit equipment is mounted on swinging relay gates in the rear of the sections. In fact, all of the labor in connecting relays, condensers, repeating coils, keys and associated equipment of the cord circuits was performed in the factory before shipment of the switchboard.

The main frame and line relay equipment are assembled on one of the standard combination frames originated by the Stromberg-Carlson company. With this arrangement the apparatus is not only accessible but considerably less floor space is required in the terminal room. In this particular installation, it was necessary to keep a nine-vertical main frame in service at the same time the new equipment was installed, both frames being in the same room, a feat that could not have been accomplished if the use of separate relay bays were employed.

The power equipment is of ample size to carry the load of the present installation for a period of 48 hours in case of a power failure, and to function perfectly if the ultimate number of lines (1600) is installed. The power board consists of two slate panels, 24 ins. by 30 ins., which provides adequate space for mounting all of the necessary switches, relays, meters, coils, etc., used in connection with the power set-up.

Provision is made for automatic charging of the main battery, employing the use of a Sangamo watt-hour meter, which is

placed directly between the full-size Weston volt and ampere meters on the face of the power board. The attendant is thereby enabled to judge accurately the condition of the power equipment by simply glancing at these closely-associated meters.

In connection with this ampere-hour meter, there are provided the very necessary alarms, both audible and visible, to advise the attendant in the event of an alternating current failure, tube failure, or the operation of protection fuses, etc.

The Well-Constructed Efficient Telephone Exchange Building of the Scotia Telephone Co. at Washington, Mo.

The main battery consists of 11 cells of the Electric Storage Battery Co.'s E.M.G.O.9 chloride accumulator cells. The toll booster battery is also of the chloride accumulator type and consists of 11 C.T.M. units. Both of these batteries are of the improved, sealed and spray-proof type.

Facilities for charging the main battery consist of a 12-ampere, full-wave Tungar rectifier in conjunction with the mentioned ampere-hour meter and a half-ampere noiseless type Tungar rectifier for the booster battery.

Ringing current is derived from standard Stromberg-Carlson 1-B converters, in connection with two Holtzer-Cabot motor-driven interrupters; one to operate from 110 volts alternating current and one from 24 volts direct current.

Although there was a substantial increase in the subscribers' rates at the time this equipment was cut into service in May, 1931, there was but one telephone taken out up to December 1. To offset this loss, there were 74 new subscribers added during the same seven months period after the new service was inaugurated.

This tells a story which should be of vital interest to operating executives, as it has been demonstrated time after time that a healthy net gain in stations can be directly attributed to improved service and especially so coincident with the conversion of a magneto system to up-to-date common battery.

The first telephone company in Washington was organized by A. A. Tibbe in 1896. In that year Mr. Tibbe installed not only the telephone plant but also the electric light plant. In 1912 he sold both the telephone and the electric light company to the Union Electric Co. of Missouri, which operated the telephone plant for several years. In turn, it sold to Walter Heiner, who managed the plant under the name of the Commercial Telephone Co. until 1923. At that time, the plant was sold to P. Kerr Higgins, of St. Louis.

It is interesting to know that the first switchboard purchased by Mr. Tibbe was manufactured by the Dean Electric Co. of Elyria, Ohio. The Dean Electric Co., later known as the Garford Mfg. Co., was purchased by the Stromberg-Carlson company, which, in turn, replaced the Dean board with a Stromberg-Carlson. This switchboard was replaced by the present common battery Stromberg-Carlson equipment.

The population of Washington is 6,000, and the town is showing a steady and substantial growth. It has three banks, all in first class condition, and is the home of quite a few large manufacturing concerns. The famous "Missouri Meerschaum" pipe, known the world over, is manufactured in Washington. We doubt if there is any smoker who does not know what a "Missouri Meerschaum" is, but if there is, it is commonly known as a "corn cob" pipe.

The local manager of the Washington exchange, Hugo Palisch, states that since the installation of the new equipment he has had nothing but words of praise from his subscribers. The service is fast, reliable and sure and, as previously stated, has resulted in an increase of subscribers.

Mr. Higgins has been in the telephone business in the United States and foreign countries for a period of nearly 50 years. He is a native of Scotland and started in telephone work as a messenger boy over there.

He is president of the Port Arthur Telephone Co. of Port Arthur, Texas, where he is operating a 5,500-line switchboard. He also has Stromberg-Carlson equipment in operation at Coweta, Okla., and Eldon, Mo. The city council, civic organizations, as well as the leading citizens of Washington, manifested sufficient interest to induce Mr. Higgins to provide Washington with modern service.

The excellent service being rendered at Washington is reflected throughout the entire county. Recently the leading and progressive citizens of Union, the county seat of Franklin county, expressed their desire to obtain the same quality service as furnished at Washington and to pay a rate commensurate with this improvement.

Wisconsin Company Operators Remind Citizens on Voting Day.

City telephone operators, on April 5, contributed toward bringing out a record vote in Milwaukee, Wis. All calls coming into their switchboards were answered:

"Don't forget to vote today! Number, please?"

Prices in the Metal Markets.

New York, April 11: Copper—Steady; electrolytic spot and future, 5¾c. Tin—Easy; spot and nearby, $18.62; future, $18.80. Iron—Quiet; No. 2 f. o. b. eastern Pennsylvania, $14.50@15.00; Buffalo, $14.50; Alabama, $10.00@11.00. Lead—Steady; spot New York, 3.00c; East St. Louis, 2.90c. Zinc—Steady; East St. Louis spot and future, 2.80c. Antimony, 6.00c; Quicksilver, $74.00@76.00.

The New Four-Position Switchboard Which Was Placed Into Service in the Recent Change to Common Battery Service at Washington, Mo.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Tri-State St. Paul Rate Investigation Hearings Started.

Presentation of testimony before the Minnesota Railroad & Warehouse Commission in the hearings on rates of the Tri-State Telephone & Telegraph Co. in St. Paul began on April 5. After valuation figures had been given by D. F. Jurgensen, chief engineer for the commission, a recess until April 18 was decided upon so that these figures might be studied.

Properties of the Tri-State company in the St. Paul metropolitan area were valued at $9,483,166 by Mr. Jurgensen. The cost of reproduction of the properties at current prices would be $12,557,154, he testified. This includes $11,914,047.65 as the valuation of the plant and equipment and $643,106.62 for overhead charges, including interest during construction, materials and supplies, employes' working funds and organization expenses.

Land of the company in the area involved was valued at $219,915, and buildings, less depreciation, at $1,100,102. Other items making up the total valuation, less depreciation, included the following:

Central office telephone equipment, $2,043,873; other equipment of central office, $50,015; station apparatus, $737,784; station installations, $332,024; interior block wires, $8,450; private branch exchanges, $259,090.

Booths and special fittings, $14,987; pole lines, $346,080; aerial cable, $483,112; bare copper wire, $3,302; bare iron wire, $15,840; covered wire, $1,419; service drop wires, $165,936; underground conduit, $1,081,596; underground cable, $1,781,624; submarine cable, $3,246; office furniture and fixtures, $104,912; shop equipment, $3,683; store equipment, $4,595; autos, trucks and trailers, $26,818, and tools and implements, $51,655.

The state introduced the valuation findings of the engineer in an attempt to show that a reduction in rates would be justified and still allow the company to make a profit on its investment of at least 3 per cent. What reduction will be asked has not been revealed.

In his report, Mr. Jurgensen testified that he omitted a number of items now included on the books of the telephone company but not now in use or useful in telephone service.

This included $149,327 in underground conduits and $64,594 in underground cables. The property not now in use was abandoned after the Tri-State company acquired property from the Northwestern Telephone Exchange Co. in 1918, the chief engineer said.

Continuing his testimony on April 6 in his figures on cost of reproduction, new, Mr. Jurgensen said he took into account the cost of piecemeal construction of company buildings considering the cost under unit construction instead. The Cedar street building was built in 1910, and an addition to it constructed in 1911 and it was finally completed in 1917. This was used in support of arguments that the piecemeal methods had added greatly to construction costs.

Sharp and repeated clashes marked the testimony and Mr. Jurgensen was cautioned several times by Commissioner C. J. Laurisch and Charles E. Elmquist, special assistant attorney general, to confine his answers to the questions. The arguments developed over attempts to enter into lengthy explanations in answering the questions.

C. B. Randall, president and general counsel of the Tri-State Company at the opening of the hearing, said he desired to learn how Mr. Jurgensen had done his inventory computing, what sources were used and how he checked the figures. The first discussion centered on land costs, in which Mr. Jurgensen said he had included only the bare cost of the land to the company.

Under examination by Mr. Randall, he admitted that nothing had been included for cost of acquisition, nor had any amounts paid by the company since acquisition, on account of special assessments, been added to his figures. Special assessments, including paving, sewer and other improvements, should have been included, Mr. Randall asserted.

"They are not owned by the company, so why should we include them," Mr. Jurgensen answered.

On April 7, it was shown that unused telephones valued at more than $30,000 were omitted from the valuation report of Mr. Jurgensen. Questioned by Mr. Randall, Mr. Jurgensen said he left out of his summary 2,879 telephones in the St. Paul area because they were not in actual service.

Asked why these were omitted, he testified the telephones in homes or office buildings had not been used for the greater part of four to five years. He admitted that he also omitted installation charges for these telephones in his report which would add approximately $6,000.

Aside from this, the testimony on April 7, technical in nature, centered chiefly around the omitted cable. Field men who made the survey under Mr. Jurgensen, were called for cross-examination to expedite matters.

John S. Gehan was the first field man of the commission to testify. He said that approximately 11,000 feet of cable he inspected and measured out of the Dale-Elkhurst exchange were not included in Mr. Jurgensen's summary.

Following suggestion by Mr. Randall, that a conference be held on the underground cable and conduit figures, John F. Bonner, assistant attorney general, and Mr. Elmquist agreed this would expedite matters and joined in the request which was granted by the commission.

The hearings were then adjourned until April 18.

Before the adjournment, however, three witnesses were introduced by Lewis L. Anderson, St. Paul corporation counsel, to back up the figures of Mr. Jurgensen on building and land values. They were Leonard C. Seamer, St. Paul valuation and assessment engineer; Harry Bronson, city building inspector, and Charles Bassford, city architect.

Although there was some difference in the system used in valuing the property, the figures of the three substantially sup-

Runzel Cord & Wire Co., manufacturers of high quality Telephone and Switchboard CORDS and WIRE and CABLE.

W. L. Runzel, President, brings to this organization 41 years' experience in the manufacture of this type of telephone equipment.

Runzel Cord and Wire Co.

4727 Montrose Ave.
Chicago, Ill.

After the joint covering is in place, the joint should be plastered with a layer of mortar cement (1-3 mix) to a depth of from ½ to ¾-inch. Where no foundation is used, the joint should be covered to a depth of approximately one inch with cement mortar.

The mortar should cover the cloth wrapping and extend over the scarified surface of the conduit. Where the duct bank consists of more than one line of conduit, the joints are staggered by the use of short lengths, starting at the

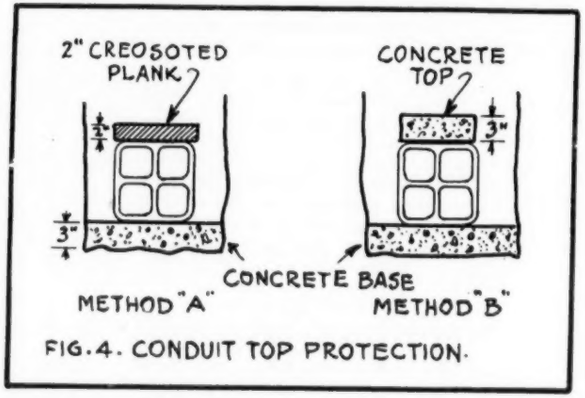


FIG. 4. CONDUIT TOP PROTECTION.

manhole. A ½-inch bed of mortar is used to separate the conduits vertically while horizontal separation is regulated by the thickness of mortar joints.

After the ducts are in place either a creosoted plank or a layer of concrete, two to three inches thick, should be placed over the ducts to protect against mechanical damage due to later excavations.

Fig. 4 illustrates the different methods used to protect the conduit against mechanical damage.

If the method used involves merely a top covering and no protection for the sides of the ducts, then the earth should be filled in along the sides of the conduit and carefully tamped until level with the top of the ducts. Care must be taken not to disturb the alignment of the ducts during the tamping operation.

After the top protection is in place the trench should be filled and carefully tamped to insure against settling of the earth.

Sewer tile duct, which is quite popular for single duct main runs and for laterals, is simply jointed together and the joint plastered with a ½ to ¾-inch coating of mortar for several inches each side of the joint.

Laying of Ducts—Creosoted Wood, Bituminized Fibre.

Creosoted wood duct can be laid without the necessity of a concrete base as its length (usually 10 feet) provides a

good footing and prevents settling with resulting misalignment of adjacent sections. In some cases the ducts are laid on a creosoted one-inch plank, the plank being provided merely to facilitate leveling and grading of the conduit.

It is not necessary to use concrete at the joints in wood duct. However, it is quite important that the joints be staggered as shown in Fig. 5 as this tends to give the conduit structure rigidity. If top protection is thought necessary, it should consist of either a light creosoted plank one to 1½ inch in thickness, or a covering of concrete similar to that specified for multiple tile duct.

Bituminized fibre conduit, where used in main conduit runs, is usually encased in concrete. This protects the ducts against mechanical damage from digging operations and also insures that the ducts will not collapse due to heavy traffic over the conduit run.

The approved method of laying this type of duct is known as the "built up" method.

With this method 1½-inch square concrete spacers are used to hold the separate ducts in proper position until ready for covering with concrete. These spacers are obtainable from the manufacturer of fibre conduit and greatly facilitate the placing of several ducts of this type. These spacers are

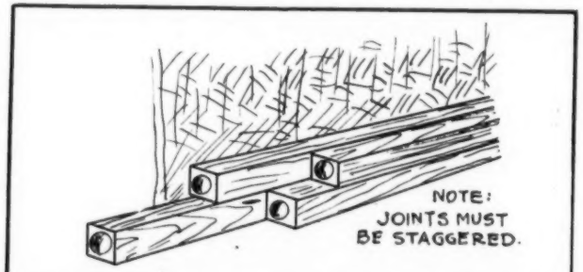


FIG. 5. METHOD OF PLACING CREOSOTED WOOD DUCT.

required about every five to eight feet. They serve to keep the ducts off of the bottom of the trench and separate from one another so that the concrete poured into the trench will completely encase the ducts, forming in effect a complete concrete duct system lined with bituminized fibre. Fig. 6 illustrates the method employed in laying fibre conduit.

In assembling the fibre conduit it is only necessary to fit the end of the conduit having no sleeve into the sleeve on the end of the duct previously laid; and, holding a piece of planking over the end of the duct to protect it, drive the adjacent sections together. Then slip a fibre sleeve or coupling loosely on the exposed tapered end of the length of conduit just laid, ready to receive the next length, and proceed.

Another method of laying fibre conduit which is sometimes employed, but which is not as rapid as the method just described, is as follows:

First pour a layer of concrete in the bottom of the trench and fit together one tier of ducts and cover with concrete, using a dry mix. (The ducts can be held in place by means of wooden spacers which are removed after the concrete is poured.) After the first layer of ducts is covered, a second tier is assembled and immediately laid on the first. This is likewise covered with concrete; and the process is then repeated until the duct system is complete. After the concrete protection is placed, the same backfilling procedure as described for multiple tile duct should be followed.

When the conduit runs have been completed, a round brush with stiff fibre bristles should be pulled through each duct to make certain that no particles of earth, sand or gravel have been left in the line.

When regular fibre conduit is installed directly in the earth without concrete protection, as is occasionally done

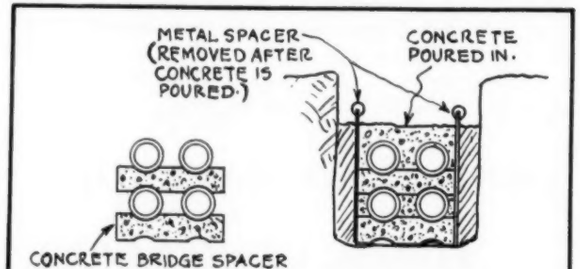


FIG. 6. METHOD OF PLACING BITUMINIZED FIBRE CONDUIT. (BUILT UP METHOD).

for laterals and to some extent for cross country toll runs, care should be exercised in backfilling to see that the earth placed around the ducts is finely divided and does not contain rocks or large lumps; otherwise the weight of the backfill and any traffic passing over the duct run will not be evenly distributed on the duct, and it might tend to flatten or collapse.

It should be noted that there are two distinct types of fibre conduit, one being intended for use where concrete protection is provided. The other, known as "signal" conduit, is intended for use where no protection is provided.

This latter type of conduit offers the small telephone company an economical means of placing cable underground, and is much to be preferred to the practice of burying the cable directly in the soil with resultant danger from soil electrolysis and lack of flexibility in subsequent cable extensions or changes.

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MANUFACTURERS' LITERATURE

The following is a brief description of recently published bulletins, catalogs, etc. If you are interested in obtaining copies address your request to the manufacturer.

Notices Previously Published

CLIMBERS

16-page booklet illustrating and describing climbers, straps, pads, tool belts and safety straps for linemen. **W. H. Buckingham, 503 State Street, Binghamton, N. Y.**

CONVERSION KIT

Bulletin No. 203 describes how surplus idle wall telephones accumulating in the stockroom, can be converted to modern, attractive wall Masterphones. Complete simple instructions for this change are included in the bulletin, together with illustrations showing details of construction. **Kellogg Switchboard & Supply Co., 1066 West Adams Street, Chicago, Ill.**

NEW BUSINESS CAMPAIGN

32-page loose-leaf book, outlining a complete advertising campaign to help telephone companies sell new customers and keep old customers sold. For large and small exchanges newspaper advertisements, post cards, folders, and other direct mail pieces are shown. **Kellogg Switchboard & Supply Co., 1066 West Adams Street, Chicago, Ill.**

OUTDOOR TELEPHONES

Bulletin No. 212 contains complete description and specifications of the new Kellogg outdoor telephone. **Kellogg Switchboard & Supply Co., 1066 West Adams Street, Chicago, Ill.**

1-A POWER UNIT

New bulletin No. 176 giving complete description of the No. 1-A Power Unit. This unit with a set of storage batteries, forms a complete power installation, for P.B.X., magneto, or small common battery switchboards. It is an ideal arrangement for an office handling 3,000 calls or less a day. **Kellogg Switchboard & Supply Co., 1066 West Adams Street, Chicago, Ill.**

POWER UNIT

Broadside describing new power units for magneto, P.B.X. and small common battery switchboards handling up to 3,000 calls per day. **Kellogg Switchboard & Supply Co., 1066 W. Adams Street, Chicago, Ill.**

POLES

A 16-page illustrated booklet entitled, "Termites—A Growing Menace to Untreated Timber." **Ayer & Lord Tie Company, Railway Exchange Bldg., Chicago, Ill.**

POLES

"Handbook of Practical Information About Cedar Poles and Butt-treating," is the title of a 40-page, illustrated book now available. **Page & Hill Company, Minneapolis, Minn.**

RECTIFIERS

Catalog TC-37, a sixteen-page illustrated booklet giving complete and up-to-date information regarding Fansteel Rectifiers and other useful data regarding their application. Gives details of the new Lead-Tantalum Rectifiers for Battery Charging and Direct Current power. **Fansteel Products Company, Inc., North Chicago, Ill.**

TRANSMITTER BATTERY POWER UNIT

New bulletin TC-39 describing the new type CAB-4 combination storage battery and trickle charger power unit for magneto operator's transmitter battery, and its use. **Fansteel Products Company, Inc., North Chicago, Illinois.**

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ported the valuation figures of Mr. Jurgensen.

The state has numerous exhibits yet to introduce in the hearing in its efforts to show that rates in the metropolitan area can be lowered by the company. On completion of its case, the company will ask for a recess of probably two months to check over the exhibits of Mr. Jurgensen and L. R. Bitney, commission statistician, before commencing introduction of defense testimony.

Sale of Small Missouri Company to Southwestern Bell Approved.

The Interstate Commerce Commission on March 18 approved the proposed acquisition by Southwestern Bell Telephone Co. of the properties of the Creve Coeur Mutual Telephone Co., which owns and operates a telephone exchange in the village of Creve Coeur, St. Louis county, Missouri. The latter company serves approximately 299 stations with a dial battery switchboard and other equipment. It owns no toll lines.

The territory served by the Creve Coeur company is adjacent to St. Louis and service is expected to develop considerably, which will necessitate the extension of plant and other improvements. The company is now carrying heavy indebtedness due to recent improvements and the management prefers to dispose of the properties rather than be required to face future financing to cover the extension of service.

On or about June 1, 1931, the applicants entered into an oral agreement, evidenced by a memorandum dated March 3, 1932, providing for the sale to the Southwestern company of all of the Creve Coeur company's properties, rights, franchises, contracts, accounts, and other assets as of October 31, 1931, for $89,124.87, subject to adjustments necessary by adding subsequently acquired assets and subtracting subsequently acquired liabilities up to the time of the consummation of the agreement.

A verified certificate of the president of the Creve Coeur company shows the minimum present worth of the property as $75,333.25. The plant was entirely rebuilt within the past year, is practically in 100 per cent condition, and none of it will be retired.

The balance sheet of the Creve Coeur company, as of October 31, 1931, shows assets of $86,952.87 as follows: Plant and equipment, $75,333.25; notes and securities, $155.25; cash and deposits, $1,399.34; accounts receivable, $7,265.71; material and supplies, $2,515.85, and other debit accounts, $283.47. Liabilities consist of capital stock, $1,000; notes payable, $69,700; accounts payable, $3,398.61, and surplus and reserves, $12,854.26. The notes payable represent advances by the Southwestern company and $1,200 of the accounts payable represent indebtedness to the Southwestern company.

These items will be offset against the purchase price and the Southwestern company will assume the remainder of the accounts payable, amounting to $2,198.61, also as part of the purchase price. Included in the accounts to be transferred are the assets, other than plant and equipment, mentioned above, aggregating $11,619.62, leaving a cash payment to be made by the Southwestern company of $27,645.88.

For the year 1930, the Creve Coeur company had a net operating income of $1,781.31 and net income of $716.20. The company, with the consent of the Missouri Public Service Commission, has instituted a schedule of rates for common battery dial service which will be adopted by the Southwestern company. These rates are not in excess of those in effect for central offices of comparable station development in the present operating territory of the Southwestern company.

Nebraska Court Denies Rehearing of Seward Rate Case.

The Nebraska Supreme Court has denied a rehearing of the Seward rate case of the Lincoln Telephone & Telegraph Co. in which it had recently held that the appeal of a group of business men to the courts from the action of the state railway commission had been filed too late to give the appellate court jurisdiction. This ends the litigation.

In support of the rehearing it was argued that the supreme court erred in holding that a motion for a new trial is a necessary prerequisite to an appeal to the supreme court from an order of the railway commission; that the court erred in holding that it was necessary for the railway commission to make a finding that appellants were unavoidably prevented from filing their application within the period of three days after the decision, before such motion could be considered on appeal, as properly filed, and in not in itself finding and determining that appellants were unavoidably prevented from filing the motion for a new trial within three days after the decision.

The attorneys apparently did not place much reliance on these points, as they further moved that the court, in case the matter could not be determined on the present record, order the cause remanded to the railway commission for the purpose of making up an issue and securing a finding by the commission as to whether or not the appellants had been unavoidably prevented from filing their motion for new trial within the statutory period. This also was denied.

In presenting their motion for a new trial, the attorneys for appellants stressed the fact that a decision on the merits of the case, which involved the question of whether rates should be raised or lowered by exchanges or as a system and what is a proper allocation of toll revenues between exchange and general offices, was very much desired by all concerned. They said they hated to be denied their day in

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court because of a technicality, and insisted that if the record were sent back for correction the case could then be submitted on the merits of the controversy.

There is nothing in the commission law that directly covers filing of motions for new trials. While the supreme court said in its opinion that it did not decide that such motions were necessary in trials before the commission, it threw the case out of court because no such motion was filed.

The attorneys concede that three days is the rule in the courts and applicable, but their complaint was that although the record below showed they were unavoidably detained in filing their motion the court said as it had not been raised and passed on below the appellate court, it could not consider it.

Desires to Close Exchange; Service From Nearby Town.

The Lincoln Telephone & Telegraph Co. has asked the Nebraska State Railway Commission for authority to close its exchange at Pauline, Adams county, which is also served by lines of the Glenwood Telephone Co., of Blue Hill. The town has a population of but 150, and the Lincoln company list totals 48, of whom 19 are in town.

The exchange is located not very far from Hastings, an important telephone point. The proposal the company made to the subscribers is that it will give them full Hastings service without any increase in rates and will also make all the necessary mechanical changes in order to make the new service available.

Rates will remain as they are—$2.25 net for business and $1.75 for residential service—but service will be given over party trunk lines to Hastings. The company tells the commission that in 1931 the revenues fell short by $1,226.27 of paying the actual expenses of operating the exchange, and that if the change in service is permitted, it will be able to save $1,700 a year.

Thirty-three of the subscribers have signed agreements filed with the commission agreeing to the proposal of the company. The state law requires that 60 per cent of the subscribers must sign a waiver of further exchange service and consent to the closing of the exchange.

Answers to the Traffic Questions Presented on Page 18.

1. In a case of this kind the operator should not require the subscriber to give the number.
2. If this information is required on the call the tributary operator should request this information at the time the call is passed to the toll center.
3. If the calling party will talk from the calling station but wishes to have the call charged to another station, enter "recd & wt. (number of calling station)" in the special instruction space and the "(number to which the call is to be charged)" in the calling telephone number space.
4. Yes.
5. If the request is for the "charge" only, we say, "The charge is (total charge)." If the request is for the time and charge and the number of minutes talked is less than the initial period, we quote the exact number of minutes talked. For example, "The charge is 50 cents for two minutes."

Commission Orders Rehabilitation of Entire Plant.

The New York Public Service Commission has ordered the Nicholville Home Telephone Co. to make certain improvements in its service and equipment at the Nicholville and Winthrop exchanges in St. Lawrence county.

The commission's order directing Gordon D. Babcock, who is the operator of the company, to make the improvements in the plant and equipment and service resulted from a proceeding initiated by the commission concerning the service rendered by this company. As a result the commission determined that the telephone equipment and service is inadequate, inefficient, improper and insufficient and that the changes and improvements directed are necessary to provide just and reasonable service.

In the testimony submitted was a report of the commission's engineer recommending reconstruction of the outside plant and equipment covering a period of five years, which Mr. Babcock stated he was willing to undertake.

Included in the recommendations for improving the plant and service are several changes designed to better the service, all of which the commission ordered the operator of the company to make within certain specified periods.

Among these is the complete rehabilitation of the central office equipment and the correction of faulty conditions described in the report, the elimination of excessive noise and high loop circuit resistance on the lines, the providing of adequate central office protection and the running of cross-connection wires in a workmanlike manner, the repairing of subscribers' stations and the replacing of obsolete telephones, the rebuilding of all outside plant and the providing for extension service to non-subscribers who desire service in the territory of the company.

It was ordered that the outside plant be reconstructed within five years and that at least one-fifth of the work be done each year. Mr. Babcock was directed to submit a detail plan of the work on the outside plant that will be done during the remainder of 1932. It was further ordered that the rehabilitation of the central office equipment, the elimination of excessive noise on the lines, the providing of protection for central office and the repairing and replacing of telephones be done within three months.

Telephone Number Suit Settled Out of Court.

A damage suit based upon a mixup of telephone numbers was settled and dismissed in federal district court in San Antonio, Texas, on March 29.

The suit was brought in 1930 by the Locke Nursery & Floral Co. against the Southwestern Bell Telephone Co. Damages of $2,900 were sought as the result of an alleged switching of telephone numbers

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It was alleged by the floral company that its telephone number for 20 years up to October, 1929, had been "No. 251." About that time three brothers of Hermann C. Locke, the plaintiff, opened a nursery in competition, and the telephone number assigned to the new firm, it was alleged, was given to the old nursery when the telephone directory was printed.

The compromise brought about settlements on each side, attorneys said.

Summary of Commission Rulings and Schedule of Hearings.

ILLINOIS.

March 23: Illinois Telephone Co.'s I. C. C. 4, original sheets 3 and 4, Jacksonville, and I. C. C. 3, original sheets 2 and 3, Carrollton, containing rates for a new service, optional common battery, eight-party line service to subscribers of the company located within certain areas adjacent to the exchanges, all points of which are within an equal distance of three miles from the company's office, effective April 14, filed and no action taken by the commission.

April 6: Special permission granted tation entered on October 26, 1927, against the Mt. Olive Telephone & Electric Co. and striking same from the docket.

April 6: Special permission granted application of the Milford Telephone Exchange to place in effect April 15, on not less than one day's notice, its schedule of rates for service connection, and move and change charges, I. C. C. No. 1, applying to Milford.

April 7: Southwestern Bell Telephone Co.'s 3rd revised sheet 1-A to I. C. C. 1, revision in the exchange territory at its Belleville exchange, effective April 29, filed and no action taken.

April 7: Jerseyville Telephone Co.'s I. C. C. 1, service connection, and move and change charges, applicable to Jerseyville, Jersey county, effective April 16, filed and no action taken by the commission.

April 7: Rixman Telephone Co.'s I. C. C. 1, rates, rules and regulations applicable to Hoyleton exchange, refiling of rates, effective April 10, filed and no action taken.

April 7: Illinois Telephone Co.'s I. C. C. 3, section 7, sheet 1, filed, collection rules of the company applicable to New Berlin and Pleasant Plains exchanges; change as shown in the revised schedule is the date from the 15th of the month in which the penalty is to be applied to the 20th of the month, and is filed for the purpose of unifying these schedules and indicating the same penalty date as that shown in other exchanges of this company, effective May 1. No action was taken by the commission.

April 7: Schedules filed concerning service connection and move and change charges, effective May 1, by the following companies:

Central Illinois Telephone Co. applicable to all its exchanges; Sparta Telephone Co. applicable to Sparta, Randolph county; Palmyra Telephone Co. applicable to Palmyra, Macoupin county; and Marissa Telephone Co. applicable to Marissa, St. Clair county.

INDIANA.

March 29: Patrons of the United Service Corp., of Monticello, filed petitions asking that telephone rates at Rossville and Mulberry be lowered.

KANSAS.

April 21: Hearing in Lancaster, Atchison county, on complaint of the Lancaster Telephone Exchange against the service now offered and having been offered and given by the East Kansas Telephone Co. at Lancaster.

Floyd M. Brown, of Lancaster, is the complainant, and the Lancaster Telephone Co., of Lancaster, respondent.

April 27: Hearing in Collyer, Trego county, on complaint of Y. A. Palkowsky against the Collyer Telephone Co.

May 12: Hearing in Basil, Kingman county, on complaint of the Alameda Telephone Co. vs. the Belmont Telephone Exchange.

MINNESOTA.

April 5: Hearings in St. Paul, which were postponed from February 2, begun on investigation of the rates of the Tri-State Telephone & Telegraph Co. in the city of St. Paul.

April 14: Hearing in Wadena on application of the Verndale & Southwestern Telephone Co. of Todd and Wadena counties, asking for authority to disconnect their telephone line from the Verndale Telephone Exchange and operate the line for the local use of the stockholders and renters.

April 18: Continued hearing on rates of Tri-State Telephone & Telegraph Co. in St. Paul after conference on testimony already presented.

MISSOURI.

April 6: Approval granted application of the Middle States Utilities Co. to serve its subscribers of the Nettleton exchange through its Hamilton exchange.

NEBRASKA.

April 7: Application filed by Bassett-Springview Telephone Co. for authority to issue $400 note to take care of current indebtedness.

April 7: In the matter of the application of the Platte Valley Telephone Co. for authority to waive the collection of installation charges on extension telephones for the remainder of the year 1932 as a sales inducement, approved, and order issued as requested.

April 7: Application filed by the Hay Springs Telephone Co. for authority to reduce from $7.20 to $6.20 a year the amount of switching dues charged subscribers provided that these subscribers pay their dues one year in advance and pay them within 60 days from the beginning of the fiscal year.

April 7: Application filed by the Lincoln Telephone & Telegraph Co. for authority to discontinue its exchange at Pauline, Adams county.

NEW YORK.

April 8: Nicholville Telephone Co. ordered to rehabilitate its entire plant over a five-year period, one-fifth of work to be done each year.

OKLAHOMA.

April 12: Hearing on complaint of the city of Waynoka vs. the Standard Telephone Co. for reduction in telephone rates in that city.

April 12: Hearing on application of the citizens of Headrick asking for a reduction of telephone rates charged by the Martha Telephone Co.

WISCONSIN.

March 30: The Inter-County Telephone Co. of Durand, which supplies rural telephone service in Bear Creek and the adjoining territory east of Durand, filed application for authority to modify its telephone rates. The new schedule is $2.00 a year for metallic circuit and $1.00 a year for grounded circuit.

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SOUTH DAKOTA'S BEST ANNUAL CONVENTION.

(*Concluded from page* 22.)

years and then discussed the future of the telephone business as it appeared to him.

Mr. Crowley stated that this country of ours passed through former depressions, and he believes that from indications the telephone companies as well as other businesses may look for a change for the better in the near future.

Chas. C. Deering, Des Moines, Iowa, secretary-treasurer of the United States Independent Telephone Association, discussed "The National Situation." Mr. Deering referred to the present revenue bill before the senate and stated that the national association did a great deal of work in order that as far as the revenue bill will affect telephone companies, it is the best bill that we could expect at this time. Mr. Deering complimented the officers of the South Dakota Telephone Association for the excellent program given during the convention.

Following Mr. Deering's remarks, the auditing, nominating and resolutions committees reported. The election which followed resulted in the reelection of three directors whose terms expired. Their names have been previously given.

At the meeting of the board of directors the present officers were reelected and the resignation of W. J. Brazell accepted. F. H. McGinnis, commercial superintendent, Dakota Central Telephone Co., Aberdeen, was appointed to fill the vacancy.

PROGRAM OF TWO-DAY KANSAS CONVENTION.

(*Concluded from page* 30.)

of the Community Church, Kansas City, Mo., whose subject will be "Confidence, the Messenger of Prosperity."

The afternoon program for April 20 includes the following speakers: John H. Agee, of Lincoln, Neb., general manager, Lincoln Telephone & Telegraph Co., whose address is entitled, "The Rural Subscriber Problem." Walter Pleasant, chairman of the tax commission, will speak on "Taxes and Why." F. B. Nichols, of Oak Hills Farm, Buffalo, Kans., will give "A Farmer's View of Telephones Rates." W. R. Kercher, of Topeka, Southwestern Bell Telephone Co., will speak on "Your Dealings with the Public."

The committee reports and election of officers will complete the session, which will be followed by a meeting of the executive committee. The annual banquet, entertainment and dance will be held on Wednesday evening, 6:30 o'clock.

The special traffic conference for the operators and other traffic people is to be held on Wednesday, April 20, the opening session to begin at 10:00 a. m. with an address by P. P. Cheatham, of Kansas City, Mo., on "Recent Developments in Toll Operating."

The afternoon session of the traffic conference will be opened with an address on "The Spirit of Cooperation," by Miss Anne Barnes, of Des Moines, Iowa, special traffic representative, United States Independent Telephone Association.

Miss Manta J. Elder, of Ottawa, Kans., chief operator of the Southwestern Bell Telephone Co., will conduct the operators' school following Miss Barnes' talk. Miss Susan Guild, dean of women, Washburn College, Topeka, will present a talk on "A Trip to Mexico."

Following an illustrated address by S. M. Hardaway, of Kansas City, Mo., Southwestern Bell Telephone Co., on "Economies in the Provision of Traffic Forces," the conference will be adjourned.

Statement of the ownership, management, circulation, etc., required by the act of Congress of August 24, 1912, of "Telephony," published weekly at Chicago, Ill., for April 1, 1932.

State of Illinois, County of Cook—ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared S. R. Edwards, who having been duly sworn according to law, deposes and says that he is the editor of "Telephony," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—Telephony Publishing Corp., 608 S. Dearborn St., Chicago, Ill.

Editor—S. R. Edwards, 608 S. Dearborn St., Chicago, Ill.

Managing Editor—S. R. Edwards, 608 S. Dearborn St., Chicago, Ill.

Business Manager—H. D. Fargo, 608 S. Dearborn St., Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given)—Telephony Publishing Corp., 608 S. Dearborn St., Chicago, Ill.; H. D. Fargo, 608 S. Dearborn St., Chicago, Ill.; S. R. Edwards, 608 S. Dearborn St., Chicago, Ill.; H. D. Fargo, Jr., 608 S. Dearborn St., Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state)—H. D. Fargo, 608 S. Dearborn St., Chicago, Ill.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

S. R. Edwards, Editor.

Sworn to and subscribed before me this 1st day of April, 1932.

M. L. Gendron.

(My commission expires November 23, 1935.)